THE FOUNDRY

for OCTOBER 1945

VOLUME 73 NUMBER 10

Editorial Staff

FRANK G. STEINEBACH
Editor

PAT DWYER
Engineering Editor

EDWIN BREMER
Metallurgical Editor

WILLIAM G. GUDE
Associate Editor

DON S. CADOT
Art Editor

VIRGINIA C. TAYLOR
Assistant Editor

New York . . . . . B. K. PRICE, L. E. BROWNE
Chicago . . . . . E. F. ROSS
Detroit . . . . . A. H. ALLEN
Pittsburgh . . . . . J. C. SULLIVAN
Washington . . . . . L. M. LAMM
London . . . . . VINCENT DELPORT

Advisory Staff

JOHN W. BOLTON, JOHN HOWE HALL
ALBERT E. GROVER, N. K. B. PATCH
HARRY A. SCHWARTZ

Business Staff

J. M. LATHROP
Advertising Manager

New York . . . . . J. F. AHRENS
Chicago . . . . . G. A. POPE
Cleveland . . . . A. L. KLINGEMAN
Los Angeles . . . . . F. J. FULLER

RESEARCH and PROMOTION
J. W. ZUBER, Manager
GRACE E. LORENZ, Circulation

PRODUCTION DEPARTMENT
A. V. ANDERSON, Manager

Main Office

Penton Building, Cleveland 13, Ohio

Branch Offices

New York, 17 . . . 16 East 43rd St.
Chicago, 11 . . 520 N. Michigan Ave.
Detroit, 2 . . . . . 6560 Cass Ave.
Los Angeles, 4 130 N. New Hampshire Ave.
Pittsburgh, 19 . . . Koppers Building
Washington, 4 . . National Press Building
London . . . . . 2, Caxton St. Westminster, S.W. 1

THE FOUNDRY is published monthly by THE PENTON PUBLISHING CO., Penton Building, 1213 West Third Street, Cleveland, O. EARL L. SHANER, President and Treasurer; GEORGE O. HAYS, Vice President and General Manager; RUSSELL C. JAENKE, Vice President; FRANK G. STEINEBACH, Vice President and Secretary, and EDITH L. WERNER, Assistant Treasurer.

Subscription: In the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $2.00; three years, $5.00. Single copies 25 cents. Copies published three months or more previous to date of current issue, 50 cents.

Member: Audit Bureau of Circulations, Associated Business Papers, National Publisher's Association.

Copyright 1945 by THE PENTON PUBLISHING CO.

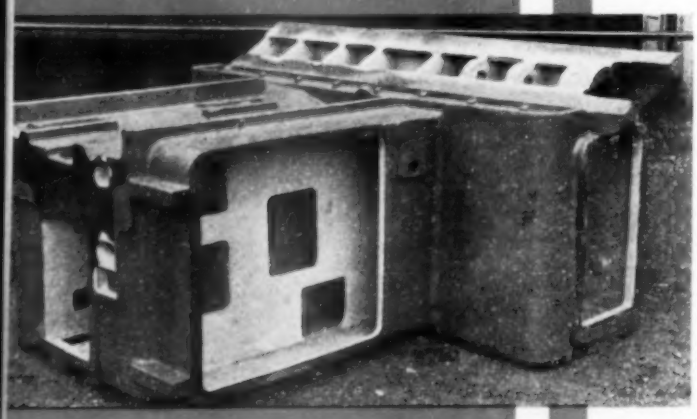
Entered as second class matter at postoffice at Cleveland under the act of March 3, 1879.

	Page
Editorial	83
Finding a Better Way To Do the Job By S. D. MARTIN	84
Use of Insulating Pads and Riser Sleeves By HOWARD F. TAYLOR and WILLIAM C. WICK	88
The Foundry Industry and Educational Institutions By ARTHUR J. TUSCANY	94
Trouble Shooting in the Magnesium Foundry By CHARLES J. SCULLIN	97
Man-to-Man on the Molder's Bench By RALPH L. LEE	98
Modernizing the Foreman Training Program By LAWRENCE STESSIN	99
Melting Furnace and Melting Practice By L. W. BOLTON	100
Small Brass Foundry Maintains Good Production By EDWIN BREMER	104
Navy Yard Foundry Meets Peak Demands By PAT DWYER	106
Foundry Research—At International Nickel Co.	110
Gray Iron Founders Plan Annual Convention	128
AFA To Hold 50th Anniversary Convention	132
Around Detroit—Gray Iron Demand Soaring By ARTHUR H. ALLEN	136
Cyclotron Magnet Requires Large Steel Castings	138
Mold Spray Drying Speeded by Burner Arrangement	154
Good Sand Control Produces Many Benefits By M. H. HORTON	220
Accident Frequency Can Be Controlled By J. E. TURNER	226
The Adventures of Bill By PAT DWYER	238
Care Required in Melting Nonferrous Alloys By FREDERICK H. DAVIS	266

Questions and Answers	114	Foundry Developments	232
Men of Industry	120	Obituary	246
Foundry Statistics	130	Equipment and Supplies	250
Foundry Data Sheet	141	Industry Briefs	262
Foundry Group Activities	146	New Trade Publications	268
Washington Notes	216	Where-to-Buy Directory	306

Index to Advertisers 320

How they do it



In Rutland, the Lincoln Iron Works makes 4900-pound beds for Thread Grinders. They pour these in molds of all Linoil dry sand and the interior cores are all made with Linoil. They like Linoil. They have made 1500 of these beds for one customer.

The entire production of Lincoln Iron Works for the last five years has been for the Machine Tool industry—precision castings for precision tools, and made with precision oil. Most of their castings, ranging in weight from ¼-pound to 7,000 pounds, are made in dry sand—Linoil dry sand. Some are extremely complicated.

LINOIL

Lincoln Iron Works, like many another foundry making intricate castings of medium to heavy weight, find it is good practice to use dry sand molds. Cost of oil and drying is compensated for by speed in setting up mold, more assurance of a perfect casting, ability to cast to closer specifications, elimination of expensive grinding and machining, and in the better looking job that the dry sand casting makes.

Strictly uniform oil for cores has long been an element in foundry profits, but when large castings are made in dry sand molds the uniformity of the oil used becomes of prime importance. Lincoln Iron Works knows from long experience that Linoil is uniform, year in and year out. Lincoln Iron Works knows Linoil has many other good qualities and is perfectly willing to give credit where credit is due.

Order Linoil next time and see for yourself why Lincoln and a thousand other foundries always use Linoil. There is a Linoil warehouse near you.

THE WERNER G.

(DIVISION OF ARCHER

2191 WEST 110 STREET WOODBINE

DEC 12 1945

RECEIVED
RESEARCH LABORATORIES
LIBRARY

Credits and Debits In War Production

PRODUCERS of castings share with industry as a whole the tribute paid for the magnificent war production job which was such an important factor in attaining complete and final victory. How fully the foundry industry will share in the vast peacetime opportunities which lie ahead will depend to a large extent on how it copes with some of the problems which have developed or been accentuated during the wartime period.

While it is recognized that nothing is more wasteful than war—every tangible article in the United States could have been replaced for what World War II cost us—it is natural to attempt to evaluate the various developments which are a by-product of war's quickened tempo for industry. So far as the foundry industry is concerned it is possible to list some of the major credits and debits which have accrued to it as a direct or indirect consequence of the war and to consider their significance with regard to the years ahead.

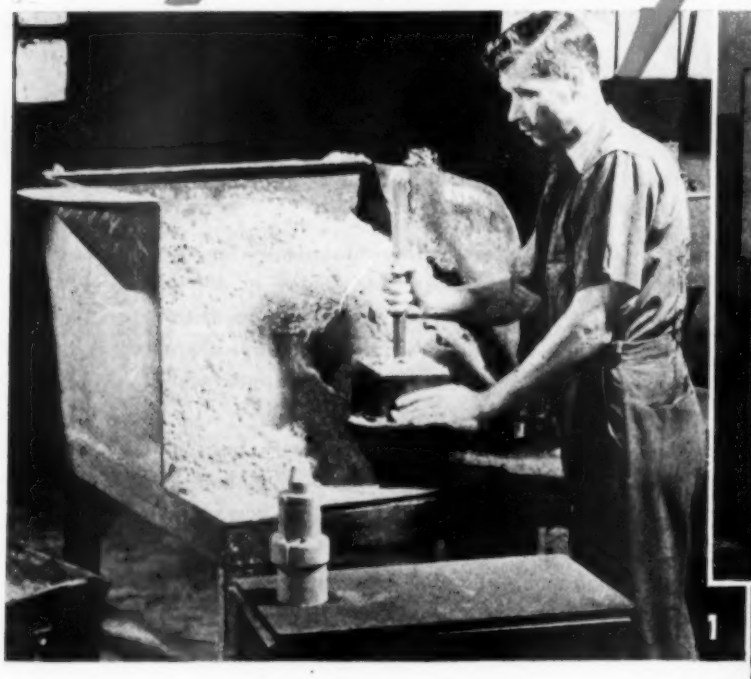
On the credit side of the ledger is the increased recognition accorded castings in general as an engineering material. This reacted principally to the benefit of gray iron and malleable castings—products not regarded too highly from the standpoint of war requirements at the opening of hostilities—although steel and nonferrous castings capably demonstrated their adaptability to new applications. Metallurgical developments of war years, too numerous to detail here, have been of major importance and, if universally adopted, stand to benefit the foundry industry immeasurably in its efforts to attain not only improved quality of product but, what is of equal or greater importance, consistency of quality.

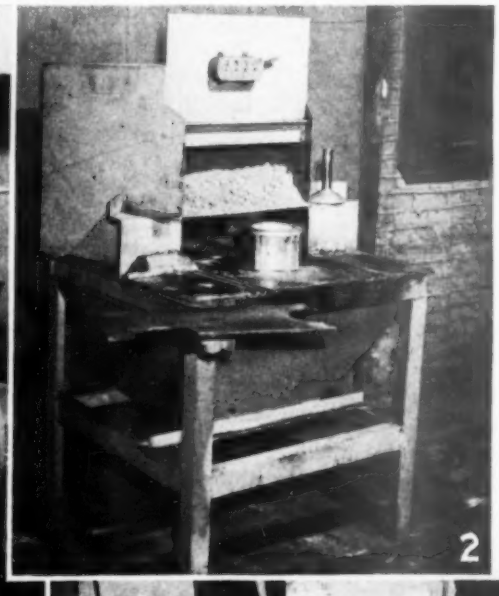
Turning to the debit side we find the unfavorable publicity given the foundry industry on the score of working conditions. It is useless to rehash the inept actions of certain government agencies which helped to promote the idea that the foundry is an undesirable place in which to work, but it obviously is the industry's job to correct, insofar as possible, the conditions which give credence to the charge and which make it difficult to obtain the type of workers the industry requires.

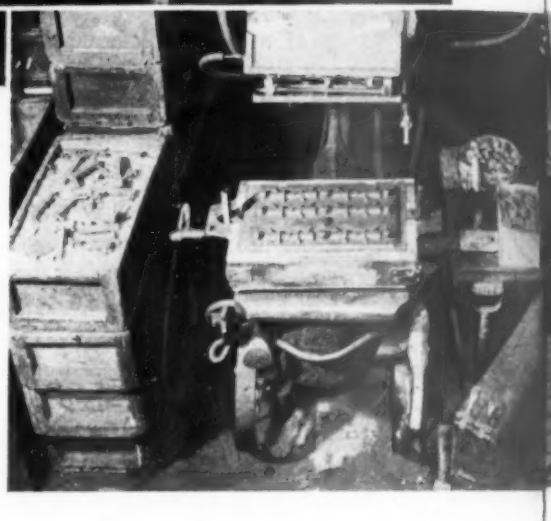
Another sore point uncovered by the war might be termed a cost allergy. Briefly, too many foundries before the war had not been charging enough for their products because they had no true conception of their costs, and when ceiling prices were imposed they were pinched. This condition must be corrected if the industry is to prosper in a competitive world.

End of the war has wiped out a huge backlog of business in castings for munitions, but a large pent-up demand for civilian products is waiting and anxious to be filled. Nevertheless, the foundry industry cannot afford to be lulled into a feeling of false security by the large volume of prospective business at hand. The past few years have brought into perspective various shortcomings which must be remedied if the progressive developments of the same period are to be capitalized on in the future.

Finding a Better







DURING the past several years the foundry industry has been faced with many difficulties, the greatest being the inability to secure ample and competent labor. As a result of this condition peak capacities were not maintained and castings became a critical material for many vital products for our armed forces.

Through proper application of motion study and better methods, fatigue of foundry operations can be reduced considerably. In making a motion time analysis of foundry jobs, many unnecessary portions of operations can be eliminated, which will increase the productivity for present employees.

The result, namely less fatigue and improved working conditions, will have a tendency to induce a higher type of labor into the foundry industry, and reduce labor turnover. Another very important point is the fact that the employees' productive span of life at a high rate of pay will be increased substantially.

Frank Gilbreth, the father of motion study, stated the incentive for better methods by saying, "There is no waste of any kind in the world that equals the waste from needless, ill-directed and ineffective motions, and the resulting unnecessary fatigue. No industrial opportunity offers a richer return than the elimination of needless motions and the transformation of ill-directed and ineffective movements into efficient activity." Knowing this statement to be true and keeping the questioning attitude of *How* and *Why* an operation is performed ever in mind, the better methods or motion study department operates to improve practices.

Better methods and motion study are not new developments. They have been used by all of us for many years. It has only been in the last few years, however, that they have been applied to industrial operations in a scientific manner.

An example of this would be best demonstrated by the use of the fountain pen in the office. Anyone who uses a pen many times daily, without a doubt, does not carry it in his coat or vest pocket, or leave it in the desk drawer where it is not accessible for use. The motion study improvement for this has been the desk pen-holder, which places the pen in a convenient and accessible position. This simple holder has eliminated many unnecessary movements; First, difficult grasp; second, the operation of removing the top; third, the replacing of the top after the pen has been used; and fourth, the clipping of the pen to the vest or coat pocket. This example will apply to any industrial operation, for all jobs are made up extensively of handling tools and material, and in this case the pen is the tool that we are using. The fundamentals of motion study are the arrangement of tools and material so that they may be used with a minimum amount of motions and effort.

Through extensive research and development, we are

Better Way TO DO THE JOB

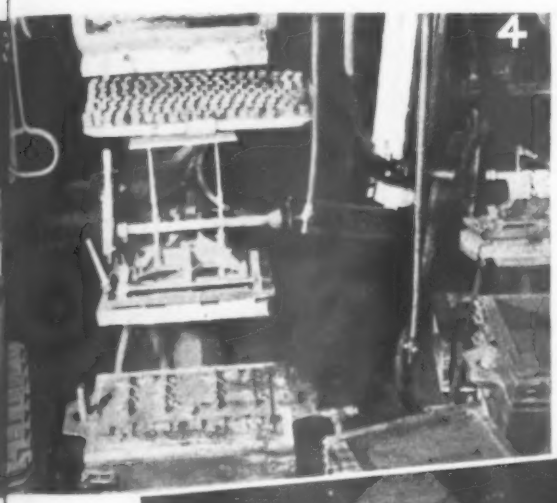
By S. D. MARTIN
Production Manager
Saginaw Malleable Iron Division
General Motors Corp., Saginaw, Mich.

Elimination of fatigue in the foundry often results from a relatively minor change in arrangement of tools, material or equipment. The accompanying "before" and "after" views illustrate how one foundry simplified various operations after motion time analysis pointed to a better way to do the job

fortunate in having a scientific method of breaking an operation down into motions and movements, and also in having time value formula to apply to the movements. In other words, it takes a definite amount of time to move a member of the body a given distance.

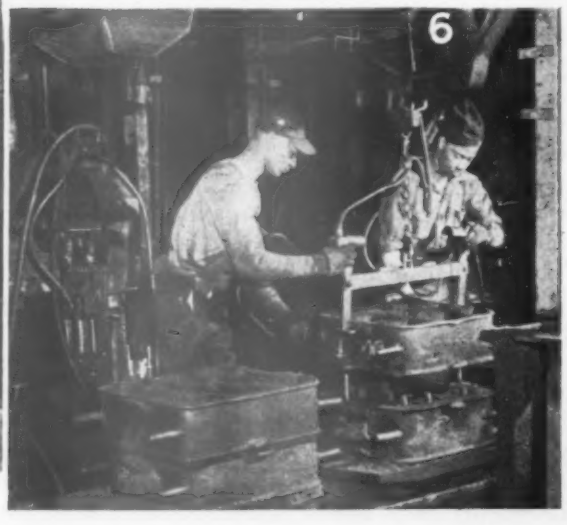
Even though a job has been improved, it would be unwise to say that the best method has been attained. It is safer to say that it is the "best method yet devised," implying recognition of the fact that further improvement is still possible. The lack of success in finding a better method for an operation is not interpreted to mean that the operation cannot be improved, but rather that no way of improving it has yet been discovered.

In the attack on any production problem, the open mind paves the way for a successful analytical approach. A thorough observation can only be made by "seeing what you look at" and "getting the facts about everything you see." The inquiring mind and questioning attitude are the fundamental characteristics of a good analyst. Deep seated convictions are disregarded and nothing is accepted as being right because it exists. Methods, tools, and layouts are questioned and all phases of the job are investigated. The questioning attitude of a better methods department should be contagious, and should spread to the supervision of the various departments. Thus, operation improvements will progress more rapidly than if left to the methods department alone.


4

5

Fig. 1 illustrates the former method used in hand ramming the bench core job. It will be noticed in this illustration that the sand supply was lower than the top of the corebox, which necessitated raising the sand to fill the box and hand peening and hand ramming the cores. The tools and material were arranged in a very unbalanced manner; the set-off table, shown in the foreground, was at some distance from the operator, which necessitated walking to dispose of the finished cores. Also, this table had a solid top which made it


6

necessary for the operator to inch the plate from the set-off table to gain control of the finished cores for disposing to the racks for baking.

Fig. 2 shows a revised bench which is now used for the making of hand-rammed cores. Notice that the sand supply is now above the level of the corebox and is merely scooped in and the box filled by the aid of gravity. The tools are in a balanced position, the butt rammer on the right side of the bench and the strike-off on the left. The set-off table is now attached to the core bench where it is much more accessible for the operator to dispose of the finished cores.

It should be noticed that the set-off table has hand holes cut for facilitating an easier grasp of the filled plates of cores for carrying to the core ovens. By setting up a balanced operation, reducing the walking time, and having the tools and materials arranged in a proper manner, a great amount of fatigue has been eliminated in this type of coremaking.

Some Cores Still Hand Rammed

Even though the majority of our cores are blown in core-blowing machines, we still have a few cores that must be hand rammed, and, therefore, we feel that it is necessary to have the properly designed bench to improve the working conditions and increase production.

Fig. 3 depicts the former layout for match plate molding. The layout of tools and material was very unbalanced, necessitating numerous movements of one hand while the other remained idle, thus making the job very fatiguing and causing the operator to work under poor conditions. The squeeze board was separate from the machine, making it necessary for the operator to get, place, and dispose of it for each mold made. The cores at the left were packed in sawdust in a disorderly manner. The chills will be noticed on the right in an old pouring ladle. The cope half of the mold, seen in the foreground, was rolled in a vertical position, which added to the fatigue of the job.

Fig. 4 illustrates how a few minor changes in material and tool layout can simplify a complete operation. All loose material has been placed in a compact and definite position and the difficult grasp of chills, cores, and tools has been changed to a simple grasp. Long, fatiguing body movements have been eliminated and a well balanced motion path has been established. The squeeze board is now fastened to the squeeze head of the machine, which eliminates getting, placing, and disposing for each mold made. The cope of the mold is now set off in a horizontal holder, which can be seen in the foreground, thereby eliminating considerable fatigue and unnecessary walking. This picture definitely shows how working conditions and fatigue can be improved without the purchase of new or elaborate equipment.

Fig. 5 shows a machine molder and his helper manually closing the cope on a large machine mold. This operation had been done manually for many years, and it can be readily realized that the fatigue of this job was tremendous and that during the past few years it was extremely difficult to get the proper type of labor to do this job.

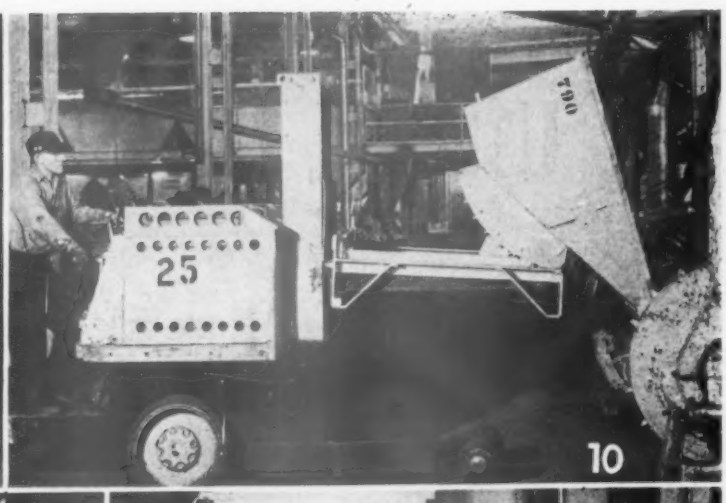
Fig. 6 shows the cope half of the mold being carried out and closed by means of a mechanical boom hoist, thus eliminating the extremely fatiguing job of manual carryout. The important factors connected with this reduction of fatigue are that any average individual can operate this simple hoist and the fact that the molder's productive span of life at a high rate of pay will be increased considerably.

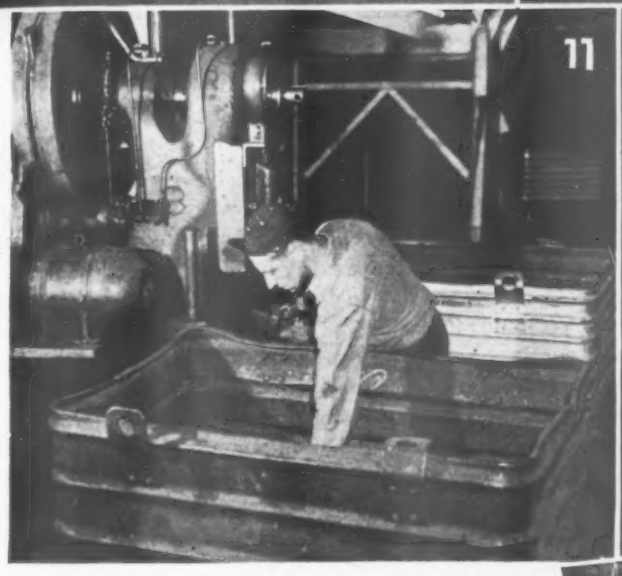
Improve Grinding Methods

Fig. 7 shows the former method of snag grinding. Tote boxes were used for servicing these machines, necessitating the operator walking to get a casting for grinding and also for disposing of the finished part. A great deal of productive grinding time also was sacrificed while the truck drivers changed setups of material. The fatigue of this job was very high and working conditions were not desirable.

Fig. 8 shows two grinders working from service hoppers adjacent to the grinding machines. These hoppers are serviced from an overhead sorting belt. Castings are sorted from this belt conveyor and by means of gravity, flow to the grinder in an easy position for grasp. It also will be noticed that the grinders are mounted on a platform and the top of the disposal boxes are at a level with the platform; thus facilitating a very easy disposal of the finished castings. In the same turning movement the operator is in a position to grasp the next casting to be ground. The fatigue of this grinding operation has been reduced considerably and the working conditions improved greatly.

It has been through the use of the hi-lift truck working



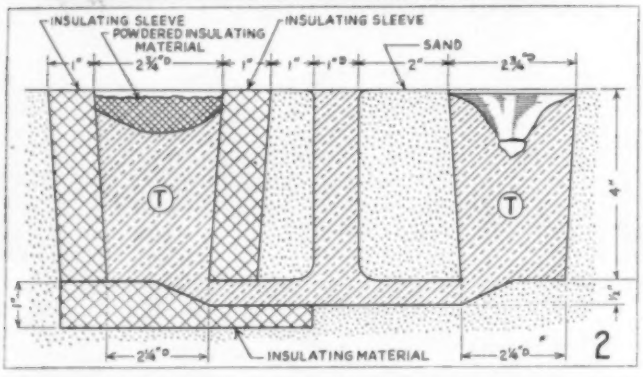


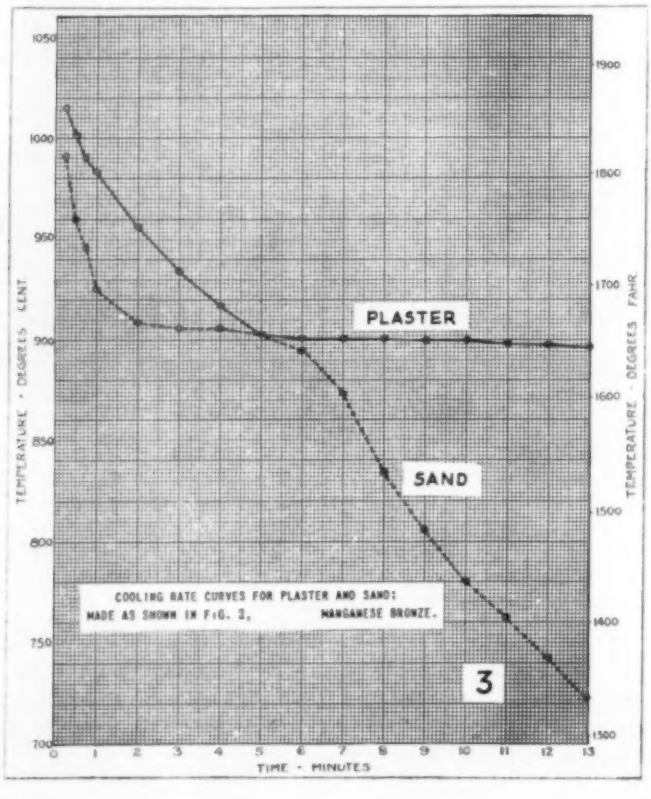
in conjunction with dump boxes, as shown in Fig. 9, that we have been able to eliminate at least 50 per cent of the fatigue in the operations throughout our finishing departments. The long, slow, and fatiguing body movements that formerly were used for getting and disposing of castings on various operations have been eliminated. Wherever castings were formerly grasped and disposed from tote boxes on the floor level, they are now brought to a normal working height of the operators. This applies to practically all operations throughout the finishing department.

Fig. 10 shows the truck and dump box filling a tumbling mill, which formerly was loaded by hand. Use of this equipment has eliminated the entire manual operation of packing tumbling mills with a resulting decrease in fatigue on the part of the operators.

Fig. 11 shows an operator in the act of getting castings for shearing the gate. It will be seen readily that the operator is in an awkward and fatiguing position. Productive time also was sacrificed in this operation to allow for load changes. (*Please turn to Page* 207)

USE OF *Insulating Pads*

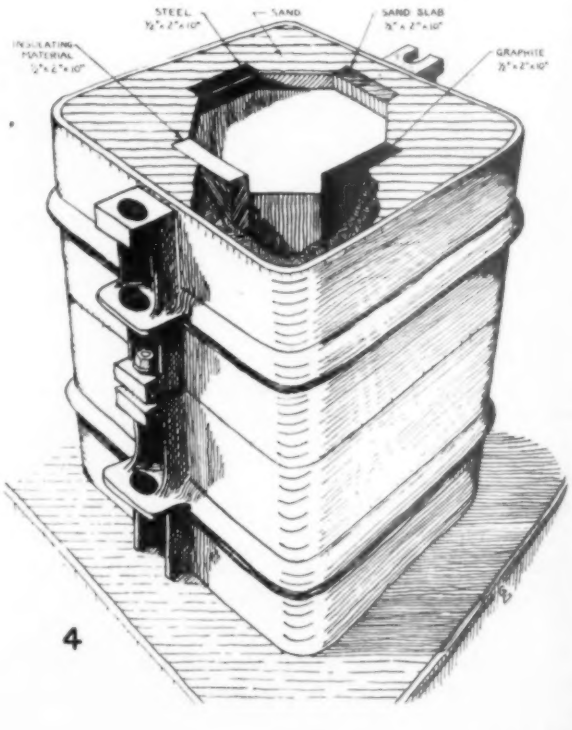




THE need for an extensive investigation of nonferrous foundry practices was particularly evident during the recent war. Increased emphasis upon inspection and the development of improved and new inspection tools have focused attention upon serious shortcomings in castings. The more strenuous performance requirements have caused an increased number of service failures, and often the replacement casting has been proved to be little or no better than the original. The demand for ever-increasing shop production and the shortage of manpower may have caused a relaxation of otherwise adequate foundry practices in some shops, but even the situation prior to the war pointed to the need for improvement in nonferrous foundry practices.

By far the greatest number of service failures have been

The opinions expressed are those of the authors and do not necessarily reflect the opinions of the Navy Department.



By HOWARD F. TAYLOR and WILLIAM C. WICK
Steel Castings Section
Naval Research Laboratory
Washington

...and Riser Sleeves FOR PRODUCING SOUND BRONZE CASTINGS

This is the first of two installments comprising a report on new foundry techniques developed at the Naval Research Laboratory, Office of Research and Invention, for the production of sound nonferrous castings. It emphasizes the dependence of good foundry practice upon proper gating and risering, and demonstrates how use of insulating pads and riser sleeves contributes to casting quality and operating economy

in castings operated under pressure. The reasons given for failure have been many and varied and often depend more upon the individual interpretation than upon any factual evidence. Sometimes the foundryman blames gassy metal caused by improper melting or wet molds; sometimes impurities or improper composition are blamed, and occasionally shrinkage caused by inadequate feeding is determined to be the trouble. Any one, or all, of these conditions may cause bad castings, but it seems probable that the greatest offender is shrinkage in one or another of its many manifestations.

Research upon the gating and risering of steel castings indicates definite limitations upon the ability of risers to feed castings adequately unless great care is taken to position and proportion gates and risers properly. The type of defect most apt to cause leakage of steel castings under

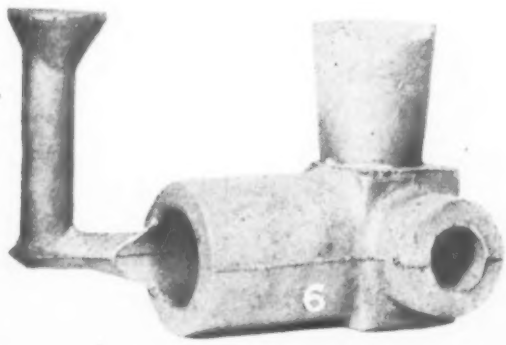


Fig. 1—Test ingots used to determine relative rates of solidification of manganese bronze in green sand and in gypsum; pouring temperature 1880 F

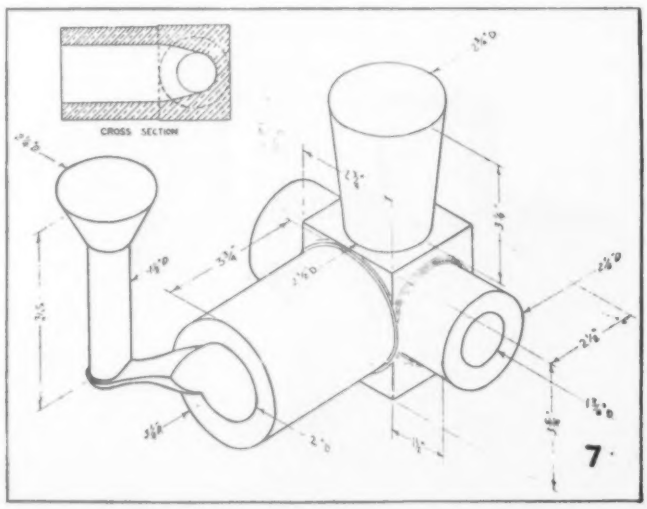
Fig. 2—Sketch showing molding technique used in solidification test of Fig 1. Location of thermocouples marked (T)

Fig. 3—Cooling rate curves for plaster and sand, made as shown in Fig. 2; manganese bronze

Fig. 4—Sketch of test mold for casting shown sectionally in Fig. 5

Fig. 5—Section from center of manganese bronze casting. Bled after 5 minutes. Pouring temperature 1810 F

Fig. 6—Hollow tee casting used to test insulated riser sleeves and insulating pads. Dimensions and cross section are shown in Fig. 7



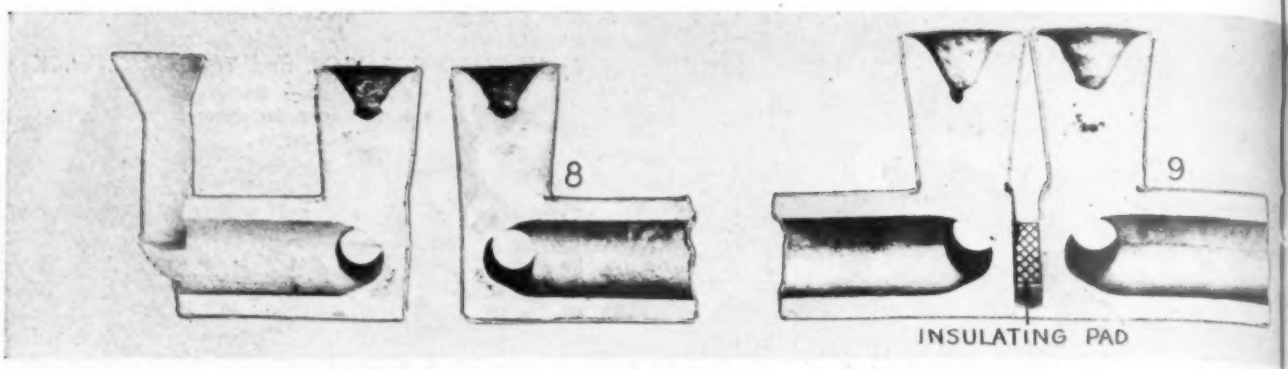


Fig. 8—Hollow tee casting made entirely in sand mold; note shrinkage. Manganese bronze, pouring temperature 1830 F

Fig. 9—Hollow tee casting made in sand with insulating pad placed as shown; no shrinkage present. Manganese bronze, pouring temperature 1830 F

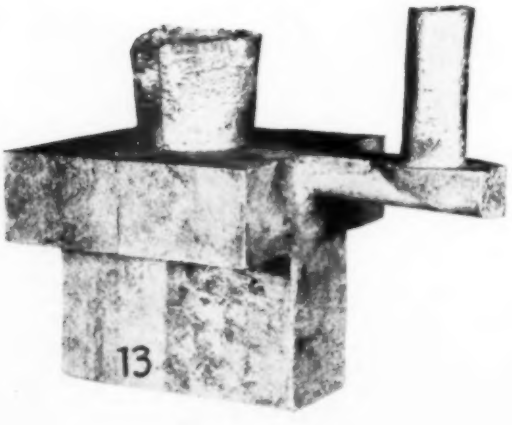
pressure is probably shrinkage because of the interconnected, filamentary voids. Gas porosity, unless extensive enough to be readily recognized as such, usually in the form of rounded, disconnected voids, would not necessarily cause leakage. Sections of nonferrous castings which have failed indicate lack of internal soundness which more often than not resembles similar sections taken from steel castings which have been made without proper attention to known laws of solidification.

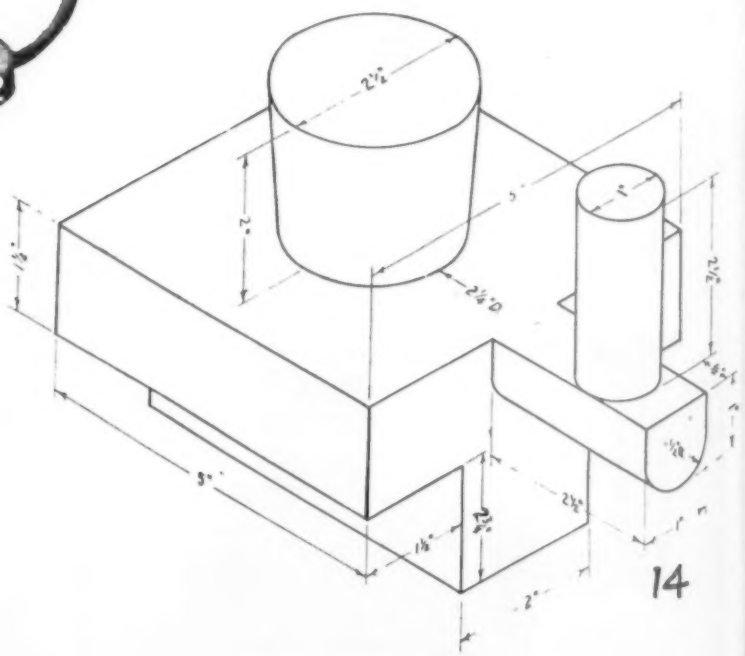
Further evidence in support of the theory that shrinkage in one form or another, if not repaired by welding, is responsible for service failures in steel castings is given in a survey made by the Westinghouse Electric Corp. in which shrinkage was definitely branded as their worst problem. This condition exists in spite of all the research which has been done on this problem in steel castings. It is reasonable to suppose that a similar condition may exist in nonferrous castings upon which relatively little fundamental research has been done.

Studies at the Naval Research Laboratory upon the effect of atmospheric pressure as a potent factor in making sound castings and, oddly enough, as an even more potent force in causing bad castings, have led to a realization of the many ways in which gating and risering can affect the end-product of the foundry. For example, serious blows at internal corners of castings, exaggerated areas of low density, and so-called "pulls", "draws", or "dishing" of castings are a result of atmospheric pressure acting upon

Fig. 12—Fluidity test spirals of ingot copper, pouring temperature 2150 F. (A) poured in plaster is 34 in., (B) in green sand is 15 in.

Fig. 13—Solid tee test casting. Sketch of same casting, including dimensions, is shown in Fig. 14





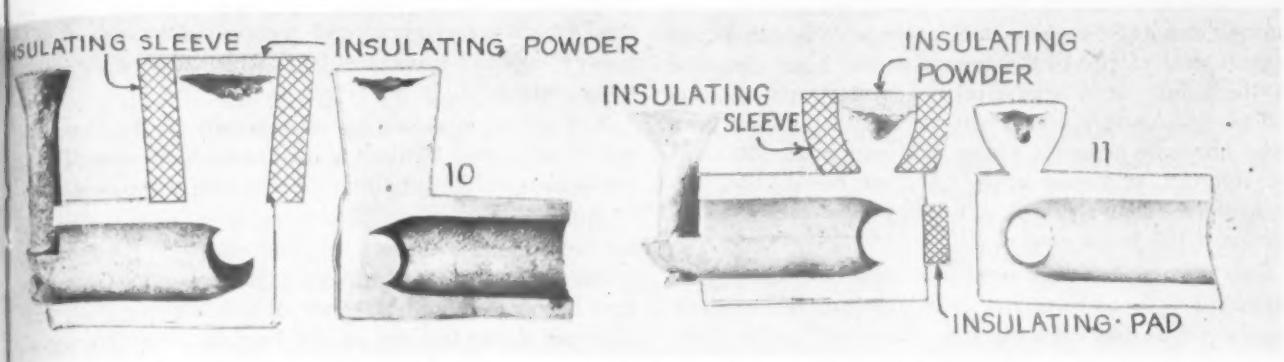


Fig. 10—Hollow tee casting made in sand with insulated riser as shown but no insulating pad. Very small amount of shrinkage present. Manganese bronze, pouring temperature 1830 F

Fig. 11—Hollow tee casting made in sand with pad and riser insulation. Manganese bronze, pouring temperature 1830 F

an improperly risered casting. Certain surface defects, particularly on cope surfaces, discontinuities which appear to be tears caused by hard molds, small cavities beneath vents and in front of ingates, and many other defects normally not associated with shrinkage, more often than not are a direct result of improper gating and risering practices.

There is a natural tendency on the part of nonferrous foundrymen to use as few gates and risers on a casting as possible because their removal from the casting is a serious problem. It is not possible to use torches for this purpose, as can be done with steel castings, and their removal by saw or cold chisel is laborious and expensive. A balance must be made between the selling price of the product and the amount of work that can be done in the machine shop, particularly with present price ceilings, and in peacetime in order to meet competition. This factor, rather than good engineering, too often determines the size, number, location, and design of risers, and inadvertently affects adversely the soundness of the casting.

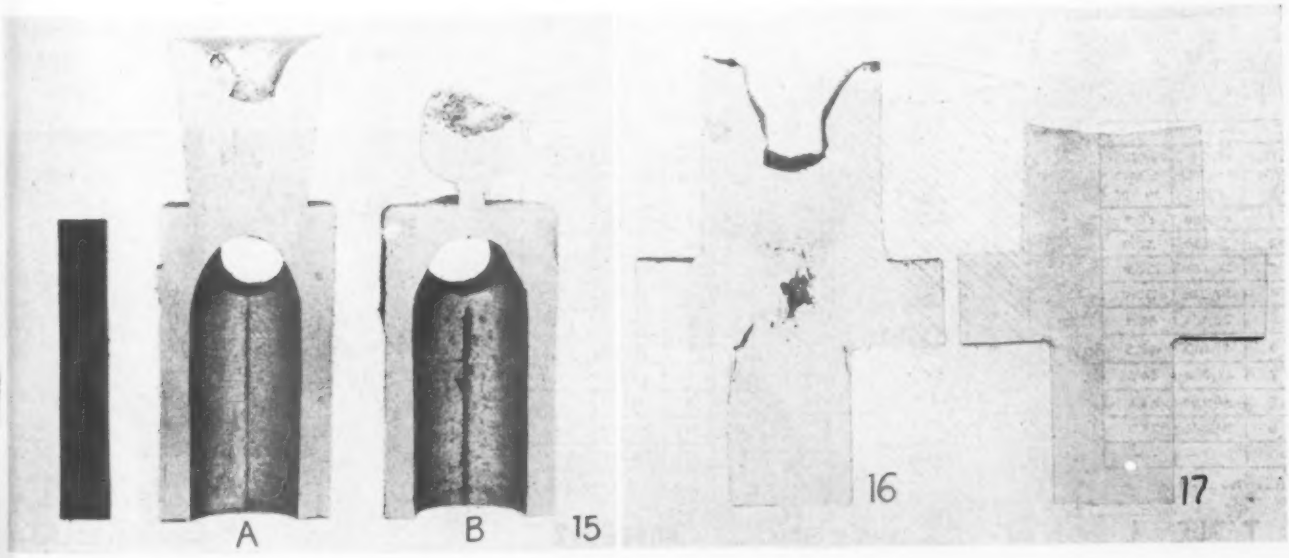
The foregoing circumstances indicate the need for fundamental information on the solidification of nonferrous castings.

Because of repeated service failures in steel castings and their generally poor performance when compared with forgings, and because a survey of the situation at the time showed little or no technical information available on the subject, in 1928 a project was authorized at the Naval

Fig. 15—Hollow tee manganese bronze castings poured vertically. (A) was poured in sand mold using uninsulated riser; (B) in sand mold with insulated riser. Total weight of (A) 18½ lb, (B) 13½ lb

Fig. 16—Section of solid tee manganese bronze casting made entirely in sand, showing effect of atmospheric pressure and inadequate riser. Pouring temperature 1830 F

Fig. 17—Section of solid tee manganese bronze casting made with insulated riser sleeve. This shows completely sound casting. Pouring temperature 1830 F



Research Laboratory by the Navy Department to study the fundamental defects in steel castings. Since that time a great deal of practical information has been compiled on the solidification characteristics, gating and risering, and general foundry practices used for steel, and the principles are quite generally appreciated and used. Much of the information should apply to other metals but, unfortunately, relatively little effort has been made to determine if this is the case.

The principle of and need for *controlled directional solidification* in castings has been recognized for many years by steel foundrymen, and numerous articles have been published on the subject[1,2,3,4]. The theory is simple but often hard to apply in practice. It means only that in order to obtain maximum benefit from feed heads and the soundest possible casting it is necessary to have the coldest metal within the feeding range of a given feeder at a point farthest from the riser and the metal be progressively hotter toward the riser at all times during solidification. The normal way to obtain proper directional solidification in a casting is to taper sections slightly toward the riser, being sure that the taper is progressive in all respects and that intermediate thin sections are not present which would solidify prematurely and choke off feeding. It is not possible to feed heavy sections through light ones, and chills or auxiliary feed heads must be provided whenever the casting is so designed as to limit the feeding range of the main risers. In other words the "ingot principle" must be used for each and every riser independently and an adequate number of risers must be provided to feed the solidifying casting.

This principle should be as important in the manufacture of nonferrous castings as it is for steel and considerable evidence is available to indicate that such is the case.

Atmospheric pressure as a factor in foundry techniques has been found to have marked influence on the integrity of steel castings, and principles governing its behaviour have been carefully determined. It is interesting that, with a proper understanding of the manner in which atmospheric pressure operates upon a body of solidifying metal, sound castings can be produced while without this knowledge unsound castings often result. It is surprising to note that little or no work has been published, and apparently little notice given this important principle by nonferrous foundrymen, even though the influence can be even more far-reaching than is the case in the steel casting industry.

An appreciation of the manner in which atmospheric pressure exerts a profound influence in foundry practice can be gained by a brief resume of everyday principles of physics. It is well known that atmospheric pressure acts on all objects to which it has access with a force equal to approximately 14.7 psi. This is a force capable of causing vessels with structurally weak walls to collapse when the pressure within them has been reduced to near vacuum levels, and in the mercury barometer to force mercury to a height of about 30 in. under similar conditions. What is more important to the problem at hand, it is the force often capable of determining whether sound or unsound castings will be made.

Any casting, regardless of size, shape, or contour can be used to illustrate the point. Atmospheric pressure acts equally on all parts of the casting and it has been care-

Fig. 18—Four solid tee castings made in same mold of "G" bronze, pouring temperature 2100 F. Two castings (2-P and 4-P) made with insulated risers; other two (1-S and 3-S) made in sand

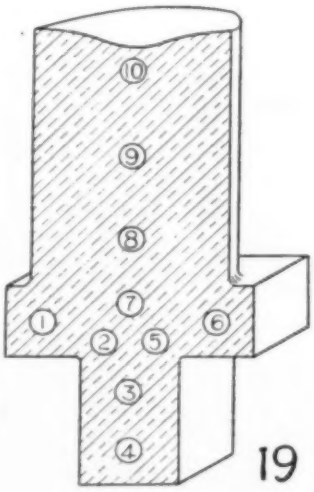
Fig. 19—Sketch of solid tee casting showing location of test specimens and test values. Table 1 insulated riser, Table 2 uninsulated riser

Fig. 20—Etched section of solid tee casting made in sand with uninsulated riser. Broken grain pattern is indicative of shrinkage. Poured of "G" bronze at 2100 F. Radiograph of same section, disclosing unsound casting, is shown in Fig. 21

PLASTER		
SPECIMEN NO	TENSILE STRENGTH P.S.I.	PERCENT ELONG. IN 2"
1	41,200	50.7
2	36,400	32.0
3	35,750	33.6
4	37,300	33.6
5	38,100	46.1
6	41,180	48.5
7	41,000	44.5
8	39,100	41.4
9	31,800	25.0
10	* —	— —

*Riser too short

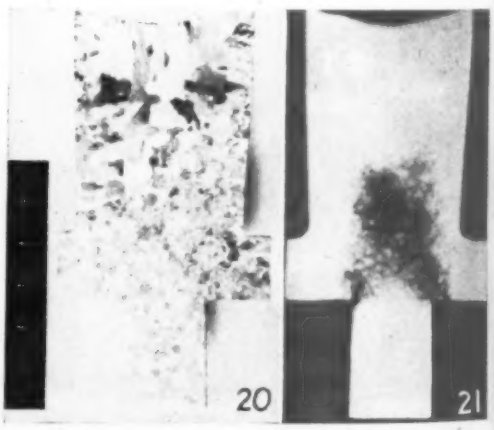
TABLE 1



SAND		
SPECIMEN NO	TENSILE STRENGTH P.S.I.	PERCENT ELONG. IN 2"
1	33,080	23.4
2	* ——	—
3	28,500	19.5
4	35,220	25.8
5	18,250	5.5
6	32,100	23.4
7	14,400	7.0
8	* ——	—
9	35,400	32.2
10	39,400	51.5

*Broken during machining

TABLE 2



fully determined that a sand mold is permeable enough to permit this. As the casting solidifies and the metal contracts in volume there is a tendency for a partial vacuum to form within the casting. If liquid contact is made at all times with the riser and progressive solidification maintained, the tendency for a vacuum to form will be offset by the liquid metal which moves in to accommodate the shrinkage. However, if for some reason, feeding is not adequate a shrinkage cavity will form, a partial vacuum will be created, and there will exist a difference in pressure between the inside and outside of the casting.

The magnitude of this difference will depend upon the amount of unfed shrinkage, and whenever it becomes greater than the strength of the solidified skin of metal around the casting, the walls will collapse or puncture at a weak spot to relieve this condition. Castings with extensive flat sections such as plates or large flanges on valves and fittings, which are difficult to riser adequately, are especially prone to "dishing" while castings with internal corners usually puncture through at the hot spot.

It has become general knowledge that if risers are to function properly they must be kept open to the atmosphere in order for this added pressure to aid in feeding. This is accomplished in ferrous castings by use of pipe eliminator compounds to cover open risers, or by the use of a core of some suitable material cast into the cavity of blind risers. Nonferrous foundrymen have not generally taken any precaution to insure their risers remaining open to the atmosphere at all times. Often sand is sprinkled on open risers for insulation, a practice which does not appear desirable because of the high specific heat of sand which causes it to absorb heat rather than to insulate, and which causes the riser to freeze prematurely. If risers are not kept open feeding may be materially reduced and atmospheric pressure may gain entry to the casting at some other point.

This brief treatment of a really extensive subject should suffice to indicate that a thorough knowledge of atmospheric pressure as it applies in the foundry is essential to the making of good castings regardless of whether ferrous or nonferrous. A paper[5] by Taylor and Rominski, entitled "Atmospheric Pressure and the Steel Casting," is a comprehensive treatment of the subject as it applies to steel, and no attempt will be made here to discuss the development in detail since fundamental principles are therein clearly covered.

Attempts to make sound shop castings from copper base alloys at the Naval Research Laboratory indicated the need for even greater attention to gating and risering than was necessary for steel castings. Risers often have to be larger and more numerous than for steel and, in general, the temperature gradients within the casting must be more carefully controlled. Even though tin bronzes show markedly less shrinkage, as manifested by riser cavities, than does manganese bronze, it was found that gating and risering for a sound casting in tin bronze was even more difficult than for a casting in manganese bronze. In order to combat the interdendritic type of shrinkage characteristic of tin bronze, risers have (*Please turn to page* 158)

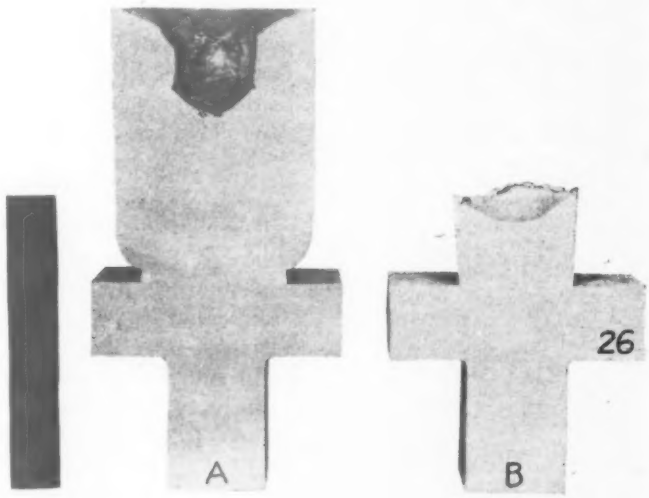
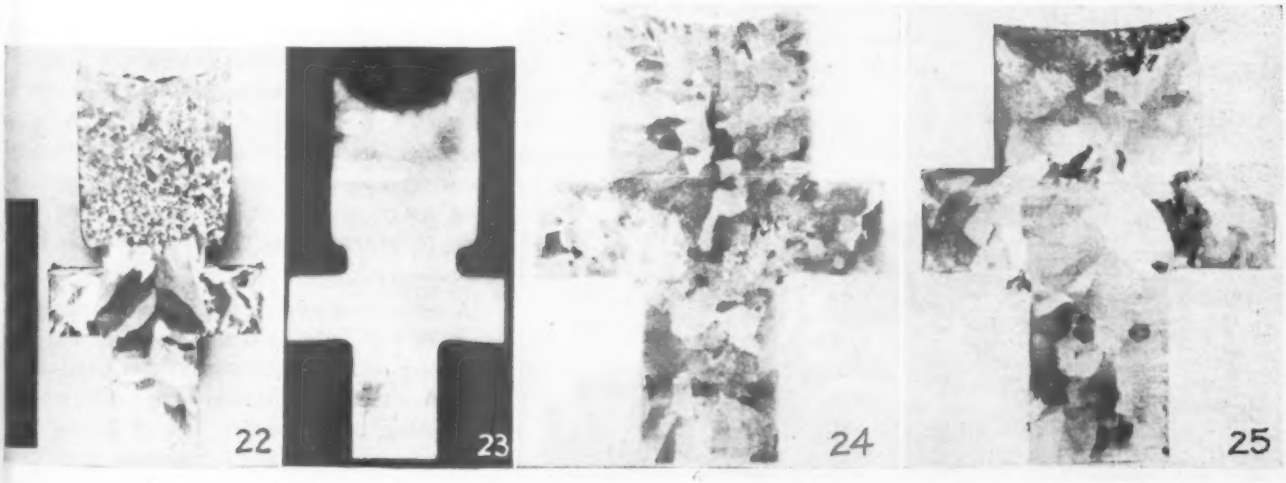


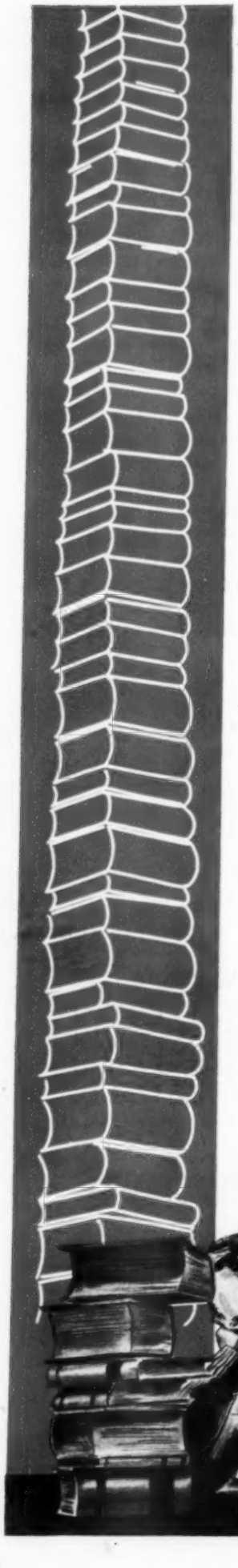
Fig. 22—Etched section of solid tee casting made with insulated riser; "G" bronze poured at 2100 F. Radiograph of same section, showing casting sound, reproduced in Fig. 23

Fig. 24—Section of solid tee casting made entirely in sand. Etched surface shows shrinkage at internal angles. "G" bronze poured at 2100 F

Fig. 25—Section of solid tee casting made with insulated riser. Etched surface shows casting sound. "G" bronze poured at 2100 F

Fig. 26—Solid tee casting made in sand to show relative sizes of riser needed to produce sound casting with and without insulation. Manganese bronze poured at 1830 F. Total weight of (A) 35 lb; (B) 21¾ lb





The Foundry Industry AND EDUCATIONAL

MANY INSTANCES have been reported where educational institutions and industries have developed a co-operative program for mutual benefit. Forward looking educational organizations recognize their responsibility and opportunity for service through a properly conceived program of this kind.

The foundry industry is no stranger in co-operating with educational institutions for the benefit of all who will receive assistance through this type of work. There are many cases of co-operation, some of years standing. Examining the results, however, in the light of changing conditions and perhaps from the viewpoint of what might be done to improve conditions as indicated by the returns achieved by other industries from similar work, there appears to be some opportunity for increased values in that direction.

Recognizing the value to be derived from co-operation with educational institutions, the Public Relations Committee of the Foundry Equipment Manufacturers Association, under the chairmanship of Bruce L. Simpson, president, National Engineering Co., proposed as one of its first activities, contact with a group of the leading educational institutions of the country with the primary purposes of determining (a) what the methods of operation now are in effect in individual institutions; and (b) the possibilities for a closer working arrangement for the important postwar era.

Obtain Information from Various Institutions

The board of directors of the Foundry Equipment Manufacturers Association quickly approved the plan and work was gotten underway by contacting 600 of the outstanding educational institutions in the country.

It should be noted that these institutions were the better known schools in their respective categories. In considering the results of the survey, this fact should be borne in mind and due allowance made in applying the possible results over the entire list of educational institutions, competently estimated to embrace a total of approximately 30,000. It is felt that many of these could or should have an interest in the foundry field.

A letter was addressed to each of the 600 organizations by the Foundry Equipment Manufacturers Association over the signature of its executive secretary. With this letter was enclosed an information form in duplicate, one copy of which was to be returned to the FEMA. The information form was quite complete and asked for much pertinent information. There was no follow-up employed and the returns which ensued were entirely the result of the one mailing. Returns showed the results in Table I.

It will be recognized that the number of responses to the inquiry was quite satisfactory. Enough representative information was received from every section of the country and each type of organization to supply a fine background.

A detailed consideration of the responses to each of the eight general questions and subdivisions contained in the confidential information sheet reveals much in the way of interesting, helpful data.

To the first question under Section 1, *"Has*

By ARTHUR J. TUSCANY

Executive Secretary and Treasurer
Foundry Equipment Manufacturers Association
Cleveland

INSTITUTIONS

your school a mechanical department which instructs in the science of foundry practice?" 81 answered yes; 35 no. In answer to the request for a brief description of this phase of their activity 14 reported that their work in this direction was included under their mechanical engineering department; 5 reported the work was under the metallurgical or metallography department; 14 reported this activity was included in their electrical and aeronautical engineering and general engineering courses; 2 indicated foundry practice was taught under the Industrial Arts Department; 18 have a so-called foundry course or operate their own foundries; 1 conducts classes at local foundries.

In answer to the query under Section 1 "*If not, would you be interested in establishing such a department?*" 25 reported yes; 13 no; and 3 perhaps.

To the first question under Section 2, "*Has your school a laboratory foundry for instructional purposes?*," 61 answered yes; 49 no.

The next query was "*If so, please describe, advising capacity and future needs.*" Because of the importance of these responses, each is tabulated at the conclusion of this article.

Section 3 indicated to recipients that there is a possibility of foundry equipment being made available to educational institutions. With the attitude of governmental departments having been indicated to be favorable toward placing much of the equipment, which it has already been determined will be surplus in the war effort, in educational institutions for instructional purposes, this question seemed to be important.

It should also be recognized that instruction of the kind in which the foundry industry has such a vital interest can best be achieved through the use of actual equipment under classroom conditions.

To the pointed question "*Would your school be interested in acquiring equipment of this type?*" 92 answered yes; 60 no. By reason of its importance, this section of the inquiry form asked recipients to indicate by the prefix 1 to 9 the order of importance of the type of equipment listed, as far as their interest was concerned. The results were so revealing and important to the foundry industry that a complete breakdown of responses received is contained in Table II.

It will be noted that melting equipment received the greatest number of first choice votes, with testing machines second, foundry supplies next, and then molding machines, casting cleaning equipment, coremaking machines and ovens.

In the second choice column, molding machines and sand preparation equipment both received 13 designations, with melting equipment running a very close second with 12. Foundry supplies and coremaking machines and ovens received 9 each and testing machines 7.

Table II presents some extremely interesting information and undoubtedly indicates several trends. One would seem to be the desire of educational institutions to be better equipped to give practical instruction on major foundry equipment. This is important and is an encouraging sign from the foundry industry standpoint.

Section 4 of the inquiry requested information as to the ability of the educational institution to acquire the desired equipment under one of four suggested methods of procedure. The results are described in Table III.

By reason of the attitude of governmental departments having been indicated as favorable toward making surplus war equipment available to educational institutions on an attractive basis, the position of the schools and colleges as indicated by the results in Table III would seem to suggest closer attention to this particular phase of the subject in the days immediately ahead.

Section 5 of the inquiry dealt with that important subject of methods of instruction, teaching aids and textbooks used. In answer to the first question under this section, *"Do you use models, drawings, or other foundry teaching aids?"* 70 advised that they did; 27 responded that they did not. The next question under Section 5 asked for a description of the individual organization's procedure. Table IV outlines the responses received to that question.

Considerable discussion has taken place in the past with reference to the textbooks which organizations use in instruction in foundry practice. The next query under Section 5 of the inquiry form asked *"What textbooks do you use?"* Table V sets out the detailed answers to this question.

Responses suggest an important question pertinent to the success of work of the kind under discussion, namely, *"Should the foundry industry give attention to the preparation of a series of textbooks for the use of educational institutions in their foundry instruction work?"* Probably a series of textbooks dealing with different phases of the question would be the best answer to the evident need which these responses seem to point out.

The next query under Section 5 was *"What other foundry aids do you use?"* Table VI gives the response to this question which sets out some interesting information.

To the next question *"If a motion picture on foundry practice was made available,* (*Please turn to page* 210)

TABLE I—Resume of Returns Received from Study

Number of pieces mailed	600
Total responses received up to May 1, 1945	260
Educational institutions reported closed	3
Institutions not interested in subject matter but willing to show any movies made available	4
Usable responses	253
Institutions reporting "not interested"	127
Interested institutions who furnished pertinent data	126

TABLE II—Types of Equipment Desired by Institutions

	1	2	3	4	5	6	7	8	9	No number preference given
Casting cleaning Equipment	5	2	4	7	8	9	7	6	5	19
Core making Machines and Ovens	4	9	11	12	9	6	2	5	2	23
Dust Arresting Equipment	1	3	0	2	4	3	7	13	13	14
Foundry Supplies	13	9	5	6	6	7	5	4	5	23
Materials Handling Equipment	1	2	5	1	2	4	14	8	7	11
Melting Equipment Including Ladles	22	12	12	5	5	4	2	0	1	25
Molding Machines	8	13	8	11	9	4	2	0	3	24
Sand Preparation Equipment Including Mixers	3	13	10	8	10	7	4	3	1	24
Testing Machines	20	7	7	5	5	8	1	4	4	21

TABLE III—Preferred Basis of Acquiring Equipment

	Yes	No
Pay purchase price	3	36
Need educational discounts	37	13
Purchase at factory cost only	29	14
Install if made available without cost	91	3

TABLE IV—Teaching Aids Used in Foundry Instructions

Models, drawings	23
Defective castings	7
Sample materials, cut aways	9
Slides, motion pictures, audio visual aids	19
Demonstrations, charts, blueprints	11
Patterns, some wood, molds, core boxes	17
Improvised equipment	1
Take classes to local foundries	1
Shop drawing illustration and illustrated foundry material	2

TABLE V—Textbooks Used in Foundry Instruction

Foundry Work—Wendt	18
Metal Castings—H. L. Campbell	15
Mechanical Tools and Processes—Hesse	7
Manufacturing Processes—Begeman	5
Cast Metals Handbook and other AFA publications	5
Notes, Mimeographed material, ICS pamphlets, faculty prepared instruction sheets	5
Foundry Practice—Palmer	3
Factory Equipment—Rose-Lytle	3
Engineering Materials and Processes—Clapp and Clark	3
Mechanical Processes—Begeman	1
Technical Production Processes—Connolly	1
Foundry Practice—Schubert	1
Foundry Work—Grennan	1
Chemistry of Engineering Materials—Wendt and Leighan	1
Units in Patternmaking and Foundry—Smith	1
Pattern Design—Hall-Kiley	1
Wood Patternmaking—McCaslin	1
Modern Core Practice Theory—Dietert	1

TABLE VI—Other Aids Used in Instructional Work

Motion pictures, slides	15
Charts, drawings, demonstrations, lectures, pictures	7
Visits to local foundries	6
Manufacturers' literature, library reference books, trade magazines, current magazines, literature	5
AFA *Transactions* and AFA literature	3
ASTM *Standards*	1
X-ray and other lab control methods	1
Operate experimental light metals foundry	1
Sand and core testing equipment	1
Instruction Sheets for Foundry—Lewis and Dillon	1
Anything that can be carted into classroom	1

TABLE VII—How Local Plants Can Assist Institutions

Aid in securing equipment; old and obsolete patterns for study	8
Arrange visits to foundries	7
Interest foundries in school programs in the trade; interest them in demanding college graduates fully trained; apprenticeship promotion	6
Give closer co-operation and advice	3
Survey of need for foundry	1
Help in developing course of all engineering students in manufacturing processes	1

TABLE VIII—Schools' Suggestions for Possible Aid

Help schools secure equipment, advise where available and when	19
Advise of latest developments; literature on new equipment; advertising that can be used by students	9
Help secure teaching aids	6
Make suitable motion pictures	4
Education advisors, teacher-supervisors, lecturers	3
Subsidize work in schools in donation of equipment and fellowships and funds for technical research	2
Contact people responsible for purchases	2
Establish co-operative program	1
Aid in setting up small school	1
Aid in equipping laboratory	1
Create interest in foundry work	1
Organize societies for students	1
Sponsor short courses with AFA co-operation	1
Provide bibliography of literature on foundry practice	1
Sell graduates on field	1
Contact manufacturers of equipment	1
Set up minimum requirements for course	1
Help set up testing laboratory	1
Send representative to see these people	1

TROUBLE Shooting in the Magnesium Foundry

By CHARLES J. SCULLIN
Magnesium Castings Section
Aluminum and Magnesium Division
War Production Board

TOO OFTEN foundrymen try to visualize in their minds what is wrong with the running of a particular job instead of falling back on the practice of many old-fashioned foundrymen. The latter set up such jobs with windows in the mold or provide some means of actually seeing what physical reaction is occurring in the mold at the point when a defect has developed.

Frequently the foundryman can shut his eyes and place a finger on the point of defect in a casting that he has struggled with. The defect always appears in the same location and is constant in its character. However, it should be remembered that the physical forces exerted in magnesium molds are of a type that never have been experienced in any other metal. By observing these forces through artificial windows, ruby glass or something of that nature, it is possible actually to see what is occurring at the point where the defect is found. This is especially effective in regard to the point of final coverage of a core.

Take the case where a core is designed according to the book and has a high permeability in the area which the metal covers last. Because of the openness of the sand in that area the gas is migrating ahead of the metal, just prior to final covering. By looking through a window in the mold, it is possible to see the metal mount and oxide compounds form in little rivulets prior to final covering. At the point of final covering, the oxide films will be enfolded and there will be bubbling and boiling at that point. Some of the so-called microshrinkage can be caused by that disturbance. Magnesium has no force in the liquid state. It absolutely will not push anything around. Therefore, in all designs, there must be no gas impingement upon the liquid metal.

One of the little contributors to scrap castings is the perforated choke gates which are used. These are tinned steel but being perforated after tinning, the raw metal is exposed to oxidation. Such oxidation is accelerated in the magnesium setup, due to the amount of sulphur employed which creates a condition of nascent sulphuric acid formed through sulphur oxide in the presence of water. Therefore, the very slight oxides formed on these perforated tins which are not properly cared for, contribute a great deal to trouble with gas blows and occlusions. Under the microscope these oxides may be seen readily on the perforations. If that particular condition is present where sulphur oxides combine with water, the reaction occurs at the most critical period of pouring. Hydrogen is freed, ignition is started and some of the so-called blooms and burning occur in those localized spots because of that condition.

Another contributor to scrap castings is careless coreroom and molding practice. The coreroom operates on the basis of high efficiency in number of cores produced. The molding room operates on the basis of number of molds closed. However, in a number of foundries, these functions seem to be performed with no regard for the casting that is to be the ultimate product. That is said advisedly because the cores are being made with sufficient strength to withstand normal handling. However, a magnesium core should be of such a fragile nature that it will require supreme care to get it into the cavity to do the work that it is supposed to do, and then will disintegrate easily in the cycle of liquid and solid shrinkage. Such a core cannot be handled with the same reckless abandon as can cores for other metals. The coreroom does not want to go to the degree of fineness essential for proper magnesium coring. The molding room will run that additional ½, 1 or1½ per cent water because drops are disliked. It would be better to have a dozen drops a day than a dozen scrap castings.

Some exceptionally fine work has been done by many on moisture in the sand, but there are a couple of small mistakes that are absolutely fatal in the preparation of molding sand. Some foundries are mulling a semiwet sand and dumping in sulphur, dumping in bentonite, dumping in crystals by the bucketful. This results in a definite segregation of materials owing to the inadequate machinery for preparing such sand, and the segregation shows up in so-called balling. These balls show up definitely on the screen after carefully riddling a half inch or so of sieved sand on the pattern face and the sieve contains all the balls. If that were the end of it, there would be no problem. But when the chute is opened and unriddled, balled sand is dumped into the flask unequal ramming results. The balls have not been segregated, and the sand has not been fluffed so that it will not jolt uniformly. It may be silly to suggest it but if you sieve every ounce of sand, the job will not blow as it does in the present sand system full of sand balls.

The first consideration should be to get away from balls rather than to add some subsequent operation that is expensive and slows up production. The sand in the muller should be as dry as possible, should be aerated and should contain no excess water. Instead of dumping ben-

tonite into the mill, it should be scattered in very slowly, preferably by some mechanical device. The same method should be followed in connection with all the other solids, and the water should be carefully metered and evenly distributed. In that way it is possible to get a fluffed sand from normal operations.

One of the little things that cause trouble in a great many shops is the handling of the metal. Taking a pyrometer out of one pot, aflame, and covered with oxide, and plunging it immediately into another pot is not good practice. It is not proper to have burning at the lip of the ladle, at the pouring box, or in the runner box. It is not good to have the metal in the runner pulsate, because a constant head should be maintained. A heavy scrap loss can be caused by carelessness in pouring. If a steady, full stream of metal is not maintained in the runner box, especially in large jobs, a reaction of burning metal will cause trouble.

It is not good practice to take the stirring rod, throw it around, and then make no effort to clean it before using the rod again. Regardless of what flux is present in the pot, dirt has no place in the metal. Careful observation has shown that it is very difficult to remove anything that may be put into magnesium. This is one of the reasons for sandblasting scrap and keeping ingot free of oxides. As an illustration of this difficulty, the troubles that a foundry was having with its welding were recently studied. Physically, the weld was beautiful and technique was good, but the weld did not pass the x-ray inspection. Examination of the rods indicated they apparently had been a bit abused and were covered with oxide. No effort had been made to clean that (*Please turn to page* 200)

MAN-TO-MAN
on the Molder's Bench

By RALPH L. LEE

WE USED to live in an old house with an oak floor of boards 18-in. wide. Whether all the rafters were walnut I can't say for sure, but I do know that those I could see when I climbed up into the attic were walnut and all dowelled together with hard wood pins.

I imagine that when the old house was built the woods were so full of every kind of timber a builder could be as finicky as he wanted to when it came to picking out lumber.

For a long time I had been wanting some lumber for my smallest snap flask but I couldn't get any from the yard for love nor money. There wasn't anything around the place that would possibly do. Even if there had been, there wouldn't have been enough of it to put in your eye. So when Johnny Cochran (that's my foundry owner friend back in Pennsylvania) sent me a riddle, several pyrometers and a bunch of other stuff I needed, I saw in the box they were shipped in the answer to my lumber problem.

I had one heck of a time getting all the nails out without splitting the boards. But after I managed somehow and took a look at what I had, I felt pretty sorry for myself. I don't believe there were any two of the boards of the same thickness, let alone width. Not only this, but there wasn't a surface on any piece parallel with its other side.

However, in spite of all this my flask boards are all made, and while I don't want to brag, I am kinda proud of them. In fact, I know I am prouder than if I could have bought just what I wanted from the lumber yard.

Remembering all the foregoing I couldn't help but think of my many visits to foundries during the past two years. I don't believe there has been one in which I did not hear someone griping about the kind of help we had been getting. And the Lord only knows there was every reason for complaint at least in comparison with the old days. I guess the supply and variety of help available then was something like lumber.

It certainly would be fine if those old days would return again. But something tells me that the chances of 18-in. oak floor board coming back again with their equivalent in help are quite slim. I'm afraid most of us are going to have to take what we can get hold of and start from there. I have often told my boy, Ralph, and myself that almost anybody can take ideal material and tools and do an acceptable job but it takes a real *he* mechanic to take what he can get and make the best of it.

When you stop to think of it, we haven't done such a bad job with the help we could get during the war. In fact, I think everyone will have to admit our foundries have performed miracles not only with their help or lack of it but with the almost impossible jobs we were given to do. Something tells me the same ingenuity which has made this possible, once turned loose on the help problem, will manage to take the human lumber available and do a bang-up job of building it into production people we are proud of.

Anyway, I'm afraid those who stall around for the return of the old days when the woods are full again are going to wake up some day and find all their business in the hands of those who get a kick out of taking what they can get and making something out of it.

Modernizing the FOREMAN TRAINING PROGRAM

By LAWRENCE STESSIN
Chief, Industrial Division
Labor Relations Institute, New York

LIVEWIRE foremen with a zest for their jobs are as vital to postwar success as ingenious designers and aggressive sales engineers. Most companies already have "freshened up" the latter for the challenging course ahead. But in many foundries the foreman training program remains no different than it was two and even three years ago.

Reconversion sets the stage for sweeping alterations in plant and equipment, in processes, in personnel and points of view. Amid these changing scenes, the training program that stands still soon loses all significance. The changes that are on everybody's mind can be made the keynote of a new and better course for supervisors. It will "click" because it's timely . . . and because foremen themselves *feel the need* for reorientation.

There are five basic ways to make the foreman training program "different." These involve: A new perspective; a change in subject matter; fresh material; new technique; a change in *place* as well as pace.

None of these is hard to accomplish. Let us take them up one by one:

1. *A new perspective.* Changing conditions outside the shop inevitably mean changes within its walls. Foundry executives already know what they will tell—and, in many cases, are already telling—their salesmanagers and product designers. The same story, with variations, can be used to "slant" the supervisory training program. In essence, it is the story of the company's changed position in relation to its market—and what must be accomplished now that Uncle Sam isn't going to buy everything anymore.

In almost every foundry there are foremen who worked elsewhere before the war, and who are unacquainted with the company's peacetime products. The rest can be forgiven for remembering little about prewar matters, after almost four years of keying every morale message to the wartime product and its contribution to victory. But the program must *look ahead,* not backward. The *projection* into the future is what counts, like peering into the "World of Tomorrow." Foremen care about that world, and about what it holds for them.

2. *Changing the subject matter.* When you consider *any* job in the light of new conditions, emphasize changes along with *the reasons why.* Take manpower, for instance. The foundry foreman of 1946 will be more concerned with keeping the "top cream" of the working force interested in staying on with the company than in recruiting new and untried workers. He will also be thinking in terms of:

a. Better human relations—a subject on which only the surface has been scratched to date.

b. Quality control and cost reduction. Both are essential to survival in competitive markets.

c. Production and safety problems arising from new methods and new products.

d. Organizing the foreman's own job. Many supervisory routines were improvised during the war, and have never been "worked out" in a scientific way.

e. Training for upgrading and transfers—also returned GI's and handicapped veterans.

f. Other departments and what they do. Lack of knowledge about the functions and responsibilities of other departments and divisions was excusable during the war. Now it is not. *Every* department head, including foremen, has a right to have his place and position clearly understood. Interdepartmental relations are due for widespread tightening up.

g. The foundry and the community. This important phase of public relations is not just a top-drawer problem. It concerns every worker in the plant, and especially the foremen.

This list could be extended indefinitely. It has as many variations as the company has possibilities and problems.

3. *Obtaining fresh material.* One of the great hazards of the typical foreman training program is its tendency to become *ingrown.* Immediate shop problems and personal experiences are the kernels of every good discussion, but they grow flat unless there is a constant change of "actors." Anyone who has belonged to a weekly luncheon club knows how important *outside* viewpoints become. There is a wealth of outside material to be obtained with little cost and effort, including:

a. Services like "Foreman Facts," published by the institute, which features events and developments affecting employment and the foreman's job, highlights government regulations, analyzes trends, summarizes polls and at the same time, instructs the foreman in his work.

b. Foreman and employee manuals published by other companies. Copies of these usually can be obtained on request; they contain much helpful information.

c. Trade papers and technical magazines. Often these "hole up" in the company library (*Please turn to page* 204)

By L. W. BOLTON

Melting Furnaces and Melting P

Trends in British melting practice are discussed in this concluding article of a series covering wartime foundry developments in Great Britain. Previous articles appeared in August and September

OUTSTANDING features on the technical side of the iron and steel industries in Great Britain during the war emergency were the intensification of research and investigational work to solve immediate difficulties, and the free exchange of manufacturing information between peacetime competitors. The need for increased production and the acute shortage of many raw materials previously considered essential, resulted in numerous problems and the rapid solution of these has been possible only by making use of all the technical facilities of the industry. Co-operation between various bodies and firms has taken place in the national interests on a scale never previously visualized.

In the gray iron industry the annual tonnage of castings produced has been somewhat lower during the war years than it was in 1939. The reason for this has been the complete stoppage of domestic building and the manufacture of all nonessential articles. The lost production, which amounted to a considerable proportion of the prewar output of iron castings, was almost entirely of the commoner types of iron such as used for rainwater goods, cookers, stoves and pipes. This decrease has been partly counterbalanced by a very marked rise in the tonnage of high duty irons produced. The high strength irons covered by British Standard Specification 786, Grades 2 to 4, (tensile strengths of 18 to 25 tons, 40,000 to 56,000 psi) were in greatly increased demand for munitions components and machine tools, and in certain applications were used to replace steel and nonferrous metal.

Back of cupolas showing charging buckets. Labor shortage and need for increased production stimulated increased use of mechanical charging equipment in British foundries

Cupola Is Efficient

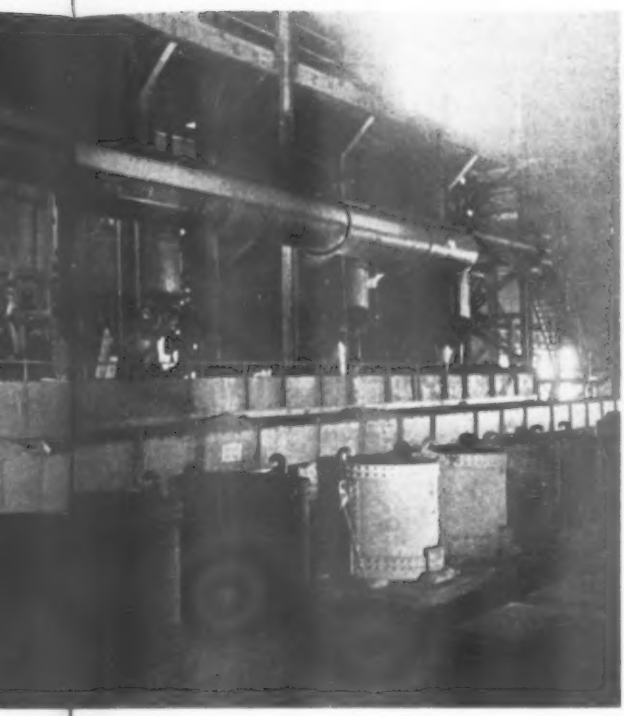
The cupola is still pre-eminent among the melting furnaces for gray iron. In the manufacture of high strength irons with carbon contents in the range 2.9 to 3.1 per cent, experience has shown that cupola melted metal has superior mechanical properties to that melted in any other type of furnace. This difference is partly due to the larger quantities of steel scrap which can be incorporated in the cupola mixtures, but also the atmosphere under which the metal is melted has an important influence. The conditions under which iron is melted in the cupola are slowly becoming better understood and for the production of high duty irons, cupola melting is no longer solely a means of securing molten iron but a closely controlled metallurgical process used to produce metal of required composition and properties.

Cupola design and operation are, nevertheless, still subjects of great interest to the gray iron founder. For maximum economy in fuel consumption, use is made of controllable amounts of auxiliary air as advocated by the British Cast Iron Research Association in the balanced blast cupola. Where high proportions of steel scrap are used, say in excess of 50 per cent of the mixture, a single row of tuyeres is generally considered to give the best results. In a new design, known as the Pari-blast cupola[1], a control valve and a volume measuring device is fitted in each tuyere pipe, thus making it possible to arrange for an equal volume of air to be admitted at each tuyere. The uniform distribution of the blast obtained with this cupola facilitates control of melting conditions and also gives evenly distributed and reduced lining wear.

Some attention has been paid in Great Britain in recent

BRITISH WARTIME FOUNDRY DEVELOPMENTS

...ngPractice



L. W. Bolton was for many years on the staff of the British Cast Iron Research Association and is an acknowledged authority on melting practice. A member of the Technical Council of the Institute of British Foundrymen, he served for eight years as convener of the Melting Furnaces Sub-Committee and has been appointed chairman of the newly-formed Basic Cupola Sub-Committee. During the war he was responsible for the design of melting units for a number of new plants and also assisted in putting new plants and processes into production. Mr. Bolton has recently joined the staff of John Gardom & Co., consulting engineers of Ripley, Derbyshire.

years to the benefits which may be obtained from the use of heated cupola blast and by the control of blast humidity, but up to the present few such installations have been made. It is now known that certain continental works[2] are employing air blast heated to higher temperatures than previously used on cupolas and of the order of 450 to 600 C (850 to 1100 F) and by this means are obtaining tapping temperatures 30 to 50 C (50 to 90 F) higher than the maximum which can be secured with cold blast. This development is being watched with interest, especially by foundries producing thin sectioned castings in high test iron and cupola malleable, where an increase in tapping temperatures would be of very considerable benefit.

Variations in the humidity of the atmosphere in Great Britain are much less than those occurring in the United States. The average range of humidity during the year is from 2 to 5 grains of water per cubic foot of air (25 to 85 grains per lb). It will be seen, therefore, that a change from conditions of minimum to maximum humidity involves an increase of only 3 grains of moisture per cubic foot. This is the main reason why few installations of cupola blast humidity control equipment are in use. Such control has, however, proved of value on cupolas producing metal for thin sectioned critical castings such as piston rings.

Increasing use is being made of mechanical methods for cupola charging. It is generally agreed that no mechanical method gives results which are quite equal to those secured with careful hand charging. Due to shortage of labor, however, and the need to increase production with existing labor, many plants installed mechanical charging devices. On the largest sizes of the furnace, the drop bottom bucket type loader operated by an electric overhead traveling crane is popular. Best results are obtained from this type of equipment when the charging buckets are so designed that those used for the metal distribute the heavier components of the charge towards the walls of the furnace, while the coke buckets spread the charge evenly across the whole area of the stack.

The tilting skip hoist loader, in which the charges are delivered into the furnace down a chute, has given excellent results on cupolas up to 10 tons per hour capacity. On larger furnaces difficulty is experienced with this type of loader in obtaining a uniform charge distribution unless provision is made for hand leveling.

Labor saving layouts have also been more widely adopted during the war years in foundry stockyards. The use of overhead traveling cranes equipped with an electromagnet, and the provision of working stock bins for pig

(Above, left to right)—Front view of cupolas; coal fired rotary furnace; converter unit

and scrap at a level so that they can be discharged directly into the cupola charging skip or bucket, have greatly reduced manual handling. In the most modern plants, the charging skip is set on an electrically operated transfer car and charge components are automatically weighed as they are loaded, the coke and limestone being added from overhead hoppers.

Better mixing of cupola melted metal, especially where the mixtures used contain components of widely differing analysis, such as steel scrap with high silicon pig, etc., is being secured by the use of heated, tilting holding furnaces. These receivers, which may have a capacity of up to 5 tons of metal, have been used with cupolas supplying continuous casting plants and have proved of great value in smoothing out slight variations in composition and also in meeting fluctuating demands for metal. The firing, which is usually oil or gas, is used for preheating before use and to maintain the metal at the same temperature as that at which it enters. No superheating is carried out in these holding furnaces and no appreciable change in the composition of metal occurs even when it is held over long periods.

One benefit arising directly from war conditions has been the success of some of the types of equipment developed primarily for the screening of glare, in preventing the dispersal of dust and grit from cupola stacks. A wide variety of anti-glare devices have been applied, some of which used water for quenching sparks, damping down flames, etc. Generally speaking, devices employing water, although extremely effective, have not been popular because of relatively high operating and maintenance costs. The most satisfactory method has been the provision of a large enclosure above the top of the stack with the sheeting arranged as louvres. The dust and grit is collected on a platform which can be swept periodically, the refuse being discharged down a chute which conveys it to ground level for disposal.

Originally designed and developed for very small emergency melts, the cupolette has proved of value in yielding a small output continuously over long periods. This type of furnace is being used to supply metal to small continuous casting plants and also to provide small quantities of special alloy and high duty irons. In the manufacture of austenitic manganese steel, cupolettes have supplied highly superheated ferro-manganese at a rate of 1500 to 2000 lb per hour, continuously for periods of 8 to 10 hours.

The difference between a cupola and cupolette lies in the curtailment of the preheating zone, the latter furnace having a stack height from tuyeres to charging level of only 4 to 5 ft. Because of its low thermal efficiency a heavy fuel charge is necessary and these two factors enable outputs as low as 1500 lb per hr to be obtained from furnaces with an internal bore of 18 to 21 in. Highly superheated metal can be produced and in spite of the low metal to coke ratios necessary, carbon and sulphur pickup are not excessive.

In the production of high duty irons, the benefits associated with cupola melting, already mentioned, are retained, thus making this type of furnace very suitable for experimental melts and they are in use in normal production in plants where the total amount of high test iron required is small. Metal is being produced to meet all the British Standard specifications for high duty iron and cases are on record where cast irons with strengths of 75,000 to 85,000 psi have been produced from the cupolette.

An interesting development of the last few years has been the use, for special purposes, of the basic lined cupola. The pioneer work by Renshaw[3] and the Ford Motor Co. Ltd, Dagenham, in the use of basic linings has shown that it is possible consistently to produce from a cupola on commercial production, metal with a sulphur content of 0.03 to 0.05 per cent. By operating with a suitably

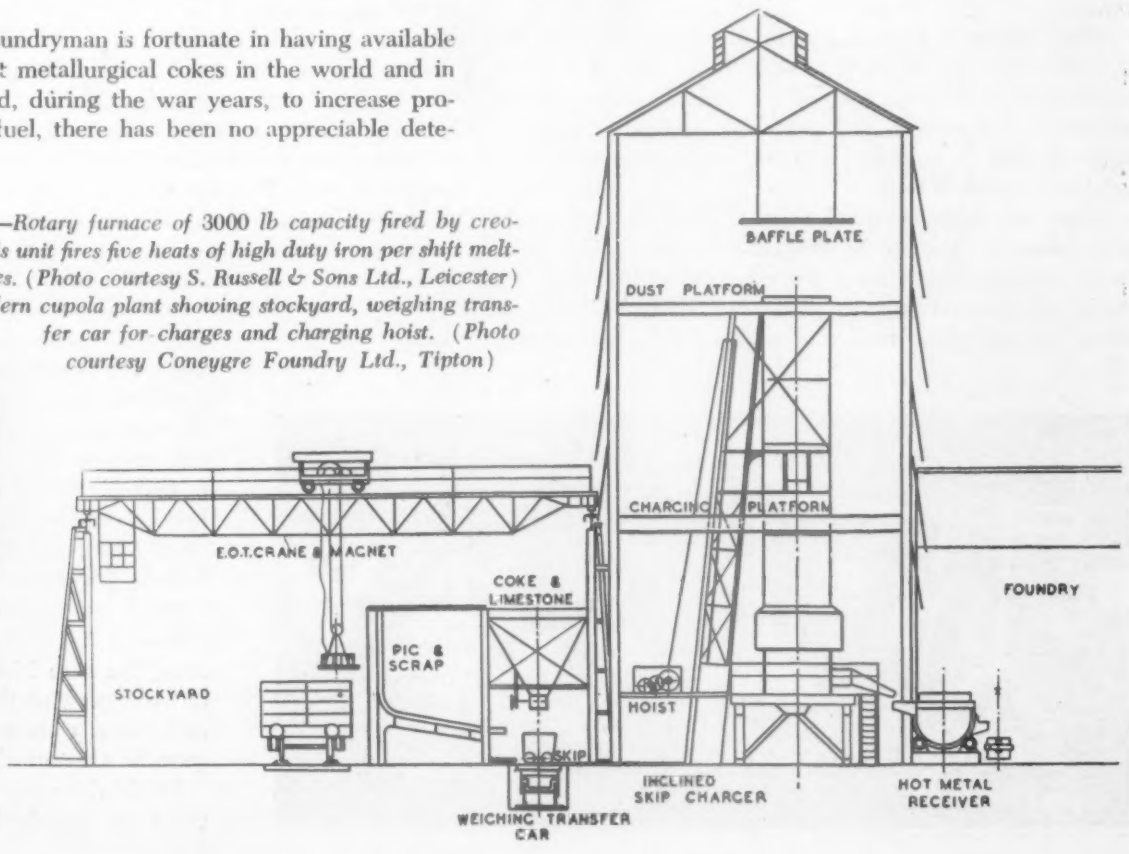
basic slag, sulphur can be removed during cupola melting and the resulting metal can have a lower sulphur content than the charge. Lining erosion is generally similar to that in an acid lined furnace.

Now that basic cupolas have been successfully operated, attention has immediately been focused on the possibilities of dephosphorizing which are offered with this type of lining. This subject is of particular interest to plants where cupolas are used in conjunction with steel converters. Experimental melts so far carried out have shown, as would be expected, that the presence of any appreciable amount of silicon inhibits dephosphorization, but considerable success has been achieved in the dephosphorization of charges containing large proportions of steel and wrought iron scrap. The Institute of British Foundrymen considers this subject of such importance that a sub-committee has been appointed to make a thorough examination. The first report of their work has already been published[1].

The British foundryman is fortunate in having available some of the best metallurgical cokes in the world and in spite of the need, during the war years, to increase production of this fuel, there has been no appreciable deterioration in quality. On the other hand, a very pressing need for economy in all types of fuel has arisen and appears likely to continue for some time to come. Arising out of this condition, Fuel Efficiency Panels, working under the authority of the Ministry of Fuel and Power, have been appointed in each area covering the whole country. In the ironfounding industry, each panel consists of a number of experts from local foundries and other interested bodies who give their services voluntarily. Visits are made by these panel members to foundries in the area, to examine the various fuel consuming processes and to ascertain whether any economies can be effected.

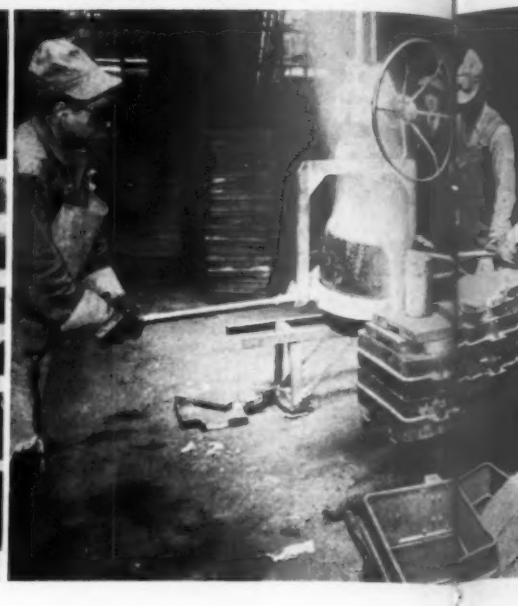
A large proportion of the total ironfoundries in the country have already been visited in this way and the advice given, particularly with regard to cupola practice, has made a valuable contribution to increased efficiency in the industry as a whole.

Of the batch type furnaces used for the melting of cast iron, the rotary furnace is most popular. Small sizes with a capacity up to 5000 lb are used where the variety or nature of the compositions required make cupola melting unsuitable. Originally many of these furnaces were fired by fuel oil but on the outbreak of war this rapidly became in very short supply. A home produced fuel, known as creosote-pitch, containing roughly equal proportions of creosote and pitch, was evolved and has given very satisfactory results, making it possible in some cases for higher thermal efficiencies to be obtained. The mixture has a high calorific value and enables more rapid melting and superheating to be obtained than is possible with fuel oil. On account of its high viscosity it is necessary for storage tanks, distributing pipes, etc. to be maintained at a temperature of 80 to 90 F. For the most satisfactory atomization a temperature of 180 to 200 F is required at the burner. (*Please turn to page* 190)



(Left below)—Rotary furnace of 3000 lb capacity fired by creosote pitch. This unit fires five heats of high duty iron per shift melting cold charges. (Photo courtesy S. Russell & Sons Ltd., Leicester) Layout of modern cupola plant showing stockyard, weighing transfer car for charges and charging hoist. (Photo courtesy Coneygre Foundry Ltd., Tipton)

SMALL BRASS FOUNDRY M



PRODUCTION of 7000 to 8000 lb of brass and bronze castings, not to mention several hundred pounds of aluminum alloy castings, is a good day's turnout for a small foundry. This job is being accomplished regularly at the Standard Brass Works, Milwaukee, with two shifts. Castings range from 1 oz to 1000 lb in weight, and, as a general rule, the larger castings are made by the night shift, since more room is available at that time.

The foundry is located against the side of a hill with a road on its top which is level with the second floor of the building. Second floor of the structure contains the coreroom and pattern storage. Raw materials for coremaking, such as sand and binders, are brought in on the road and stored in bins.

Cores are made on the bench and on a cartridge type core blower. As may be observed in Fig. 1, the cores range considerably in size. They are baked in any of the three oil-fired ovens with pyrometer control. Sand is mixed in a portable muller of which the bottom or pan forms a wheelbarrow. Sand is shoveled into the pan, the mulling mechanism contained in a housing is lowered over the pan, and the sand is mulled. Suitable bonding materials are added, and after thorough mechanical mixing, the housing and mechanism are raised from the pan. Then the pan with its load of prepared core sand is wheeled to the benches.

Cartridge type core blower is used for small cores which do not require over 2 lb of sand, and consists of an air cylinder and valve mounted in a horizontal arm with a rack and gear arrangement for raising and lowering. Sand is placed in the cartridge, which is a brass tube about 2 in. in diameter and 10 in. long. Tube is open at one end and closed at the other except for a small opening for ejection of sand into the corebox. To eliminate the use of screw clamps to hold the corebox together, Standard Brass rigged up an air clamp which functions very satisfactorily, and saves considerable time.

With the corebox in place the cartridge full of sand is placed under the air cylinder, and over the corebox opening. The lever operating the rack is pulled down to insure a tight fit at all joints of cylinder, cartridge and corebox, and the blow valve is opened and closed. The rack lever is released, the cartridge lifted away, and the air clamp released. Then the corebox is pulled forward and drawn from the core. Although the description of operating the core blower might lead to the impression that it is involved and time consuming, the cores actually are turned out rapidly.

While the method of producing cores at Standard Brass follow

yMAINTAINS

By EDWIN BREMER
Metallurgical Editor
THE FOUNDRY

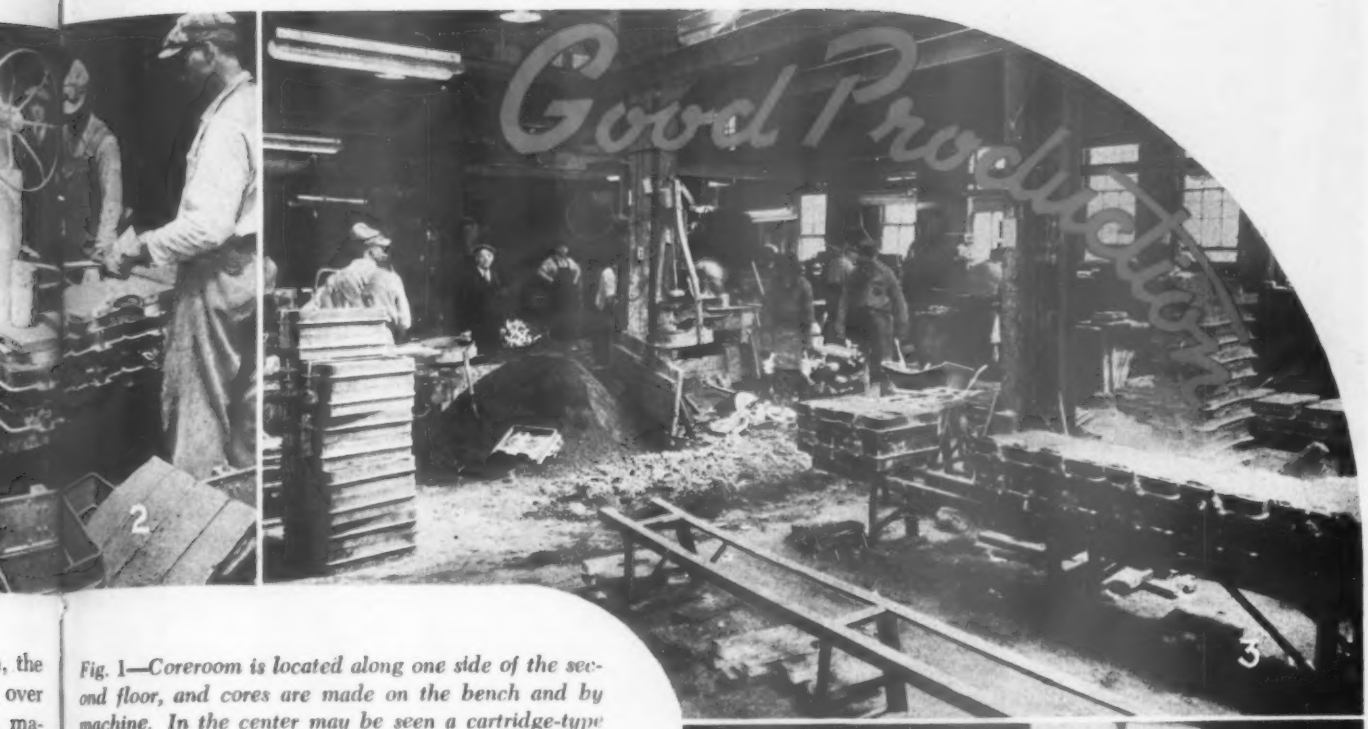


Fig. 1—Coreroom is located along one side of the second floor, and cores are made on the bench and by machine. In the center may be seen a cartridge-type core blower

Fig. 2—Molds set up on racks perform a three-way function lessening fatigue of the molder, the pourers and the shakeout men

Fig. 3—Foundry is small and compact but well illuminated and ventilated

Fig. 4—One of the molding stations showing castings, cope and drag molds, and pattern for milking machine parts

Fig. 5—Brasses and bronzes are melted in these five oil-fired furnaces located in a pit. Aluminum is melted in another furnace not shown but located just to the left and slightly behind these units

those generally practiced for bench work, mention should be made of the way in which difficulty in obtaining sound, crack and tear-free aluminum alloy elbows was eliminated. The elbow is thin-walled, about 2 in. in diameter, with 4-in. arms. Troubles encountered with a solid core were overcome by using a hollow core which provided easy collapsibility and high venting characteristics. The wall of the core is about 3/8-in. thick, and the procedure is to make one half and bake it. Then the other half while in the green state has the baked half superimposed in the proper position with a little extra core oil on the joint, and the whole is baked.

Numerous copper-base alloys, including manganese bronze, are handled in the foundry, and are melted in five, oil-fired furnaces located in a pit with their tops level with the floor as shown in Fig. 5. Metal is melted in No. (*Please turn to page* 175)

Navy Yard ... MEETS ...

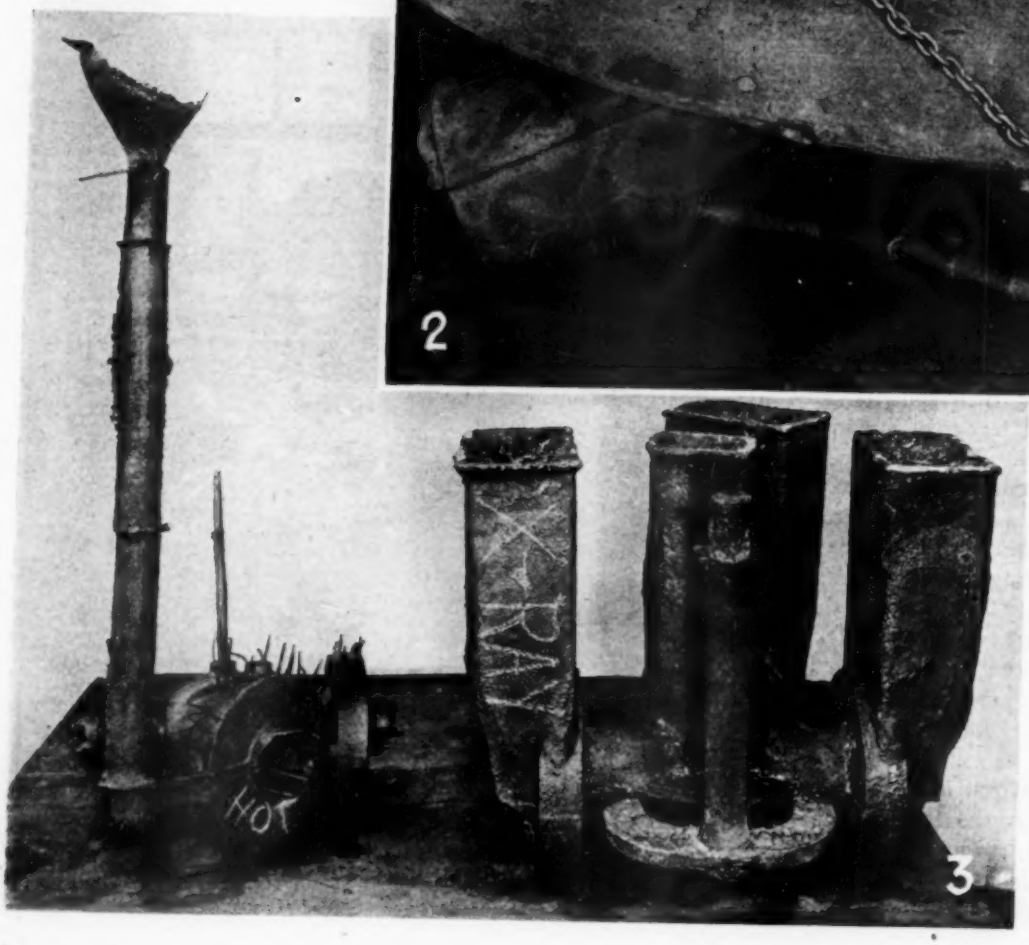


Fig. 1 — Pressure valves cast with a high sprue need no risers. Fig. 2 — Gate for hawse pipe casting enters at two points underneath. Fig. 3 — Contrast between two similar castings, poured under high and low heads, without and with feeding risers

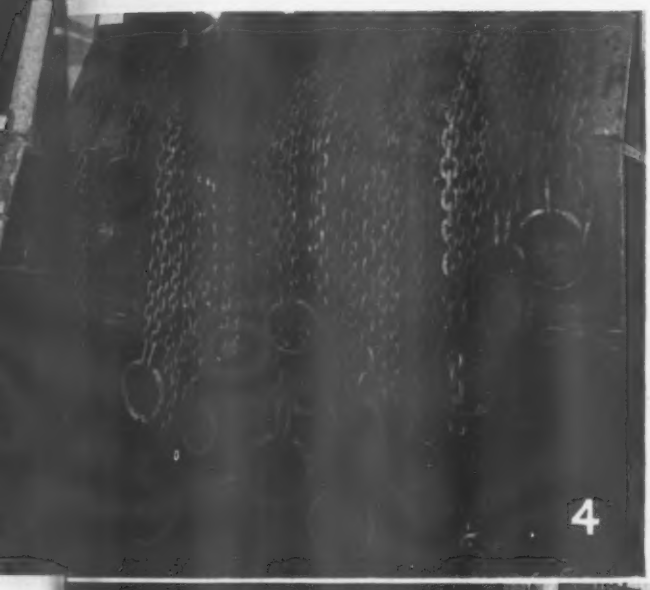
dfoundry

TSPEAK DEMANDS

By PAT DWYER
Engineering Editor
THE FOUNDRY

This is the second and concluding article describing foundry operations at the Philadelphia Navy Yard. The first article, discussing production of large propellers, appeared in the August issue

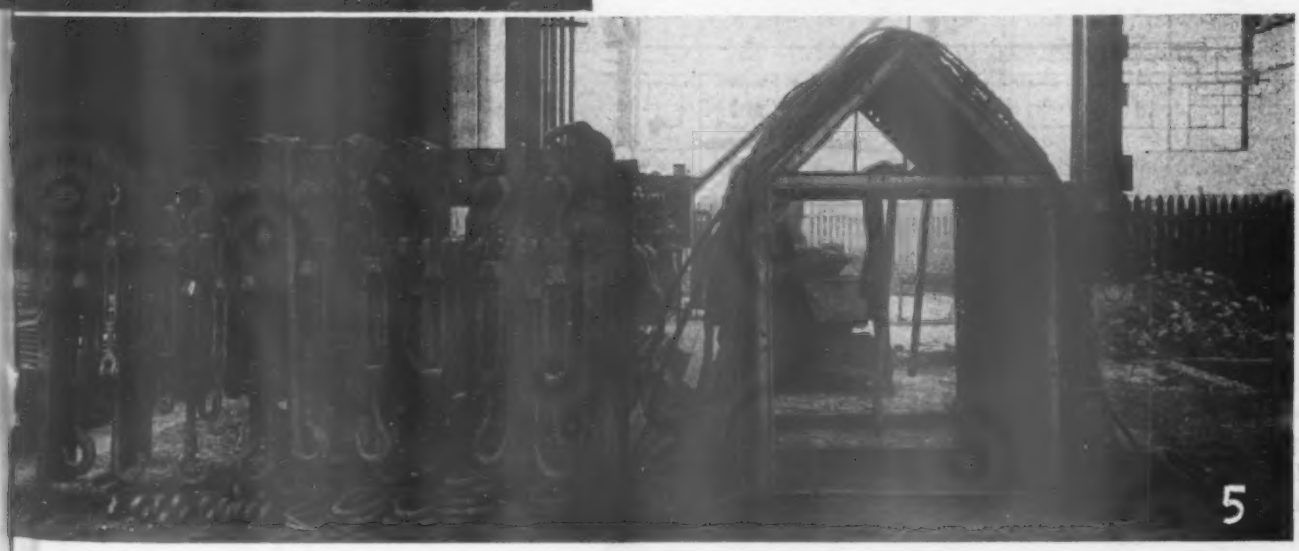
Fig. 4—Crane chains when not in use are draped in an orderly manner over the roof of a welded steel structure erected by the maintenance crew

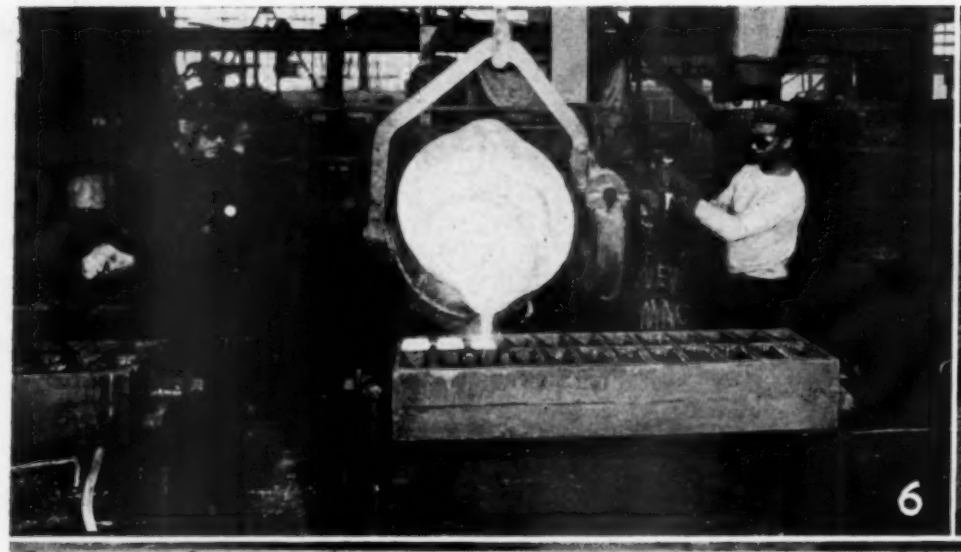


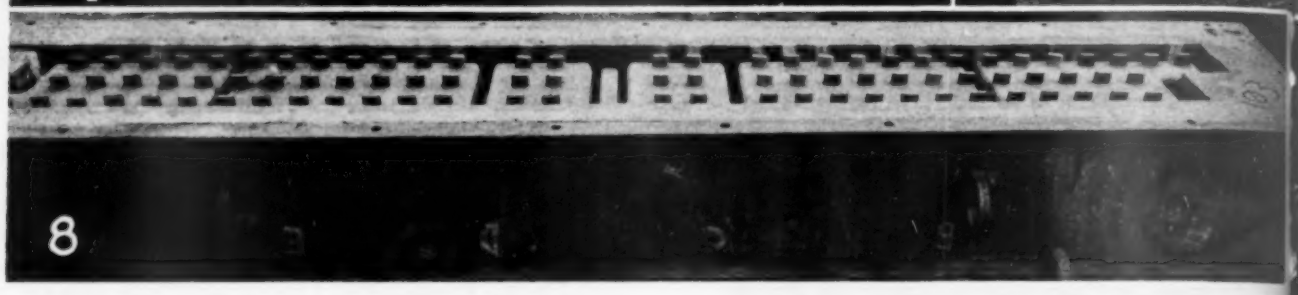
IN A general revamping and enlargement program following the close of World War I, the Philadelphia Navy Yard abandoned the foundry building which had seen service for many years, and erected and equipped a building representing the most advanced design of the period. It has functioned in a highly satisfactory manner in the intervening period and has met all demands, including the almost overwhelming burden of production imposed when the United States became involved in World War II. Around the clock, 24-hours-per-day production was maintained to deliver castings, ferrous and nonferrous, in almost infinite variety and volume.

The lofty steel frame, glass-wall building, 170 x 800 ft., is amply flooded by daylight and is equally equipped with artificial illumination for night operation. The floor area is supplemented by a gallery or mezzanine floor the full length and width of each of the side bays. Part of one mezzanine floor is the charging deck for the cupolas. The

Fig. 5 — Links, turnbuckles and hooks of various sizes when not in active service are suspended from a rack near the center of the main floor. This central location saves time and effort in obtaining the gear when required







remainder of the space is utilized as storage space for flasks, molding machines and other equipment temporarily out of commission, also for sea coal, sand binders, facing materials and other miscellaneous supplies required in foundry operation. Loads are delivered to, or taken away from, landing stages which extend into the main bay in position to be served by any one of several overhead electric traveling cranes. Incidentally, one of these cranes of 50 tons capacity, and others of lesser capacity, operate on a high runway which enables them when necessary, to carry loads over traveling and wall cranes operating at a lower level.

Although operated under one roof and a unit of the shops department of the navy yard, the foundry may be regarded as three foundries, one devoted to the production of brass and bronze castings, one to gray iron, and one to steel. The nonferrous shop occupies the greater part of the south bay, also approximately one-third of the adjoining center bay devoted to the production of large propellers in pits in the floor. Where conditions warrant, or where the necessity arises, these pits also are available for the construction of large molds for iron or steel castings. Steel castings are made in a section of the center bay equipped with two 2½-ton electric furnaces served by a common ladle pit. A third electric furnace, 1½-ton capacity, is located near the west end of the foundry. Gray iron and alloy iron castings are made in the space between the steel and heavy bronze molding floors.

Melting equipment for the iron castings includes one 42-in. and one 60-in. inside diameter cupolas, set up side by side and served by the same elevator and charging equipment. Melting equipment for the nonferrous section of the foundry includes 24 crucible type, oil fired pit furnaces, taking No. 125, or 750-lb capacity, crucibles; three induction type electric furnaces 200, 600 and 1000-lb capacity; four tilting type crucible furnaces, two with a capacity of 650 lb each, and two with a capacity of 1000 lb each. These latter furnaces are used principally for melting shop and foreign scrap for conversion into ingots of definite composition. One of two 25-ton capacity, oil fired reverberatory furnaces serves the same purpose in melting down charges of miscellaneous scrap and, with suitable additions, converting the metal into 1700-lb ingots conforming to the manganese bronze specifications for propellers: Copper 56 to 62 per cent; aluminum, tin and manganese maximum 1.50 per cent each; iron maximum 2.00 per cent; lead 0.50 to 1.50 per cent, total other constituents 0.25 per cent; remainder zinc, approximately 32 per cent.

For the small ingots, double face, cast iron molds with 24 ingot cavities on each side are mounted by pivot extensions on cast iron brackets or floor standards. After the ingots on one side have solidified, the mold is rolled over to discharge the hot ingots and to present a set of clean and fairly cold ingot molds for the next batch of metal. The ingots are small and may be handled readily.

A somewhat different technique is employed where the metal from one of the reverberatory furnaces is poured into 1700-pound ingots, approximately 12 x 15 x 30 in. The individual ingot molds are set up in a long line on a foundation 30 in. above the floor level to provide room for manipulating the large ladle from which the metal is poured over the lip. A rod resting on opposite sides of each mold supports a link 12 in. in length in such a manner that approximately one half the link will be submerged when the mold is filled with metal. Later the link serves as handle to which the crane chain is attached in lifting the solidified ingot out of the mold and in stacking the ingots in the vicinity of either furnace for recharging.

Manganese bronze for the propeller castings is melted

in a second reverberatory furnace of the same style and capacity of the other. From both furnaces the spouts project into the main bay of the foundry where pits are provided for the reception of the ladles during the tapping period. Extended reference to propeller molding and casting technique was presented in a previous article in the August issue of THE FOUNDRY.

Molds are made on both sides of a central gangway in the south bay in the nonferrous department of the foundry. Miscellaneous and odd jobs are made on one side where the sand is rammed by hand. Production castings are made on the opposite side equipped with molding machines, roller conveyors and an independent sand handling system. The molds are shaken out over a grating through which the sand falls and is carried aloft by an elevator to a storage tank and then passed (*Please turn to page* 180)

Fig. 6 — Miscellaneous nonferrous scrap is melted and poured into a double-face ingot mold

Fig. 7 — A section of the steel molding floor served by a sand distribution system and roller conveyor lines

Fig. 8 — Drag mold for flask section with bolts and vent cores in place

Fig. 9 — Skeleton patterns are employed for forming molds for large castings in one of several brick walled pits in the floor

Fig. 10—Large flasks of various capacities are constructed from sections machined on the joints and provided with special locking brackets at the ends

FOUNDRY RESEARCH—
At International

Fig. 1—Pouring arbitration or test bars at the Bayonne, N. J., experimental foundry

Fig. 2—Checking the level of the charge in the cupola by lowering a lead through the charging door of the cupola stack

This is the fourth of a series of articles describing the facilities and activities of various organizations engaged in research work on foundry products and practices. The first article appeared in July

al Nickel Co.

INTEREST in foundry problems has been keen for a quarter of a century at the International Nickel Co. and has steadily increased with the years. Facilities for studying these problems have expanded to meet the growing industrial demand for better material with the improvement of the properties of the common cast metals and the development of new materials as the main objectives.

The physical equipment of the company's experimental foundry at Bayonne, N. J., is housed in a modern industrial type of building about 150 x 60 ft. Melting facilities include induction furnaces of 30 lb capacity, an oil fired crucible, and indirect arc rocking furnace of 250 lb capacity, a three-phase direct arc furnace of 700 lb capacity equipped with two shells for ferrous and nonferrous melting and a cupola lined to 20-in. The cupola is equipped with a preheater and a lithium chloride dehumidifier. Piping arrangements permit controlled quantities of air up to 1200 cfm, ranging from 25 to 300 grains of water per pound and from normal temperature up to 1000 F to be fed to the cupola. Synthetic sand is used for molds, with the quality controlled by the usual instruments measuring strength, permeability, fineness and moisture.

The variety of equipment and its arrangement permit flexibility in the methods of study. It is possible to produce small heats varying widely in composition or to split large heats into several parts permitting an investigation of the individual effect of several factors in a constant base composition. Moreover, the practical aspects of particular operations can be studied on a pilot plant scale. The experimental foundry is, of course, part of the research laboratory at Bayonne which is equipped for studying the mechanical, physical, and corrosion properties of experimental castings as well as their chemical analyses and microstructures.

The type of problem studied is always dictated by an industrial need for better material. It may be general in nature, such as the relation between moisture in the cupola blast and the chilling capacity of cast iron, or the effect of melting and deoxidation practice on the ductility of cast steel. On the other hand, the industrial demand may be specific; e.g., a stronger bronze with better castability or bearing qualities; a lathe way with a high modulus of elasticity and capable of being flame hardened; a brake drum with high resistance to heat checking and distortion; a stronger crankshaft; a more wear resistant heat treated cylinder liner; a machine tool iron with a low coefficient of thermal expansion for precision work. These represent a few of the problems that have been studied effectively.

While improvements and modifications of common materials expand their industrial use, perhaps more significant from the foundry in-

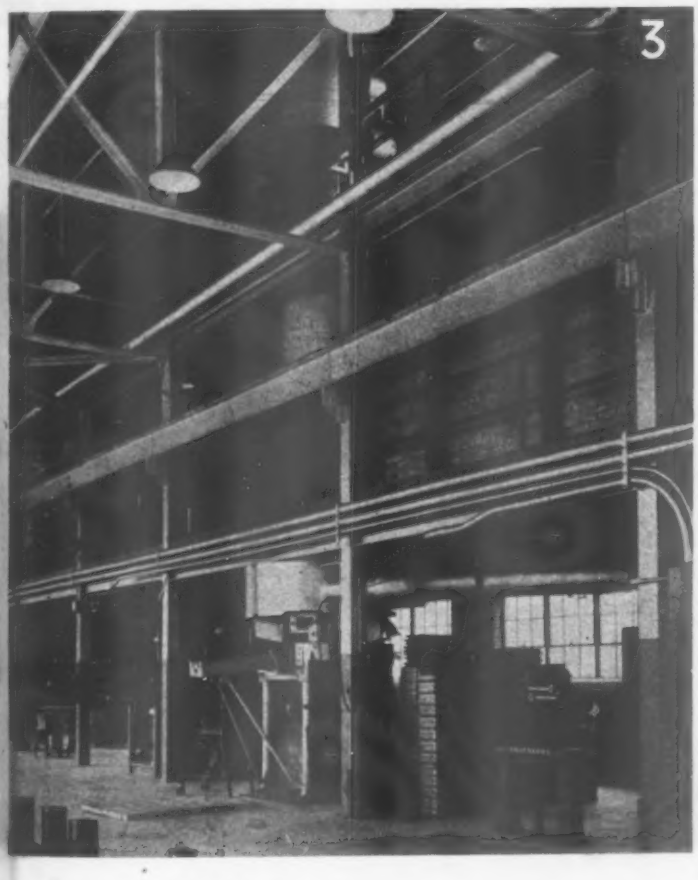


Fig. 3—Cupola and stack of experimental foundry. Cupola blast preheater and air conditioner are located on the second floor. The unit is charged on the third floor

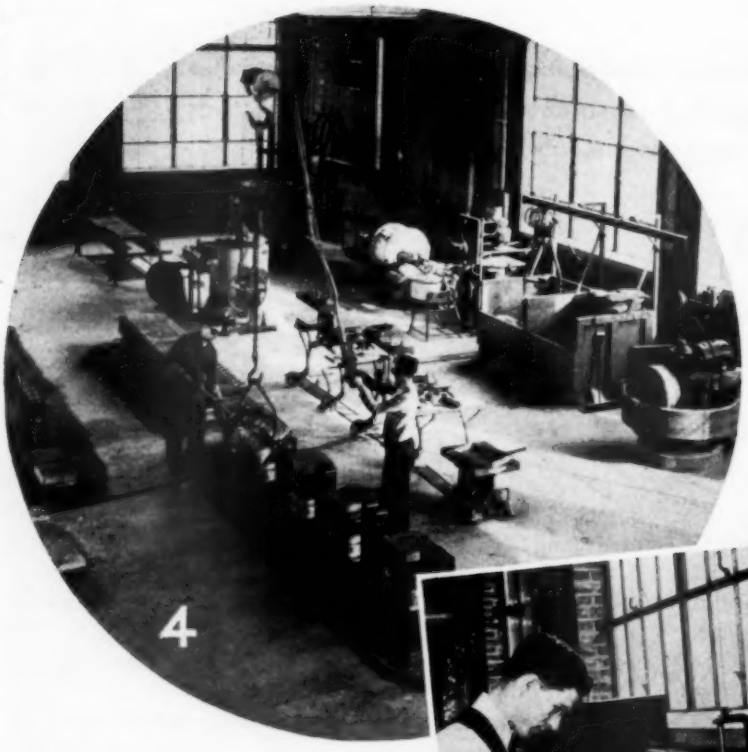


Fig. 4—Looking down at one end of the foundry floor

Fig. 5—Facilities are provided for accurate testing of sand used in molds and cores

Fig. 6—Induction furnace used in melting small heats

Fig. 7—Pouring heat from rocking type electric furnace

Fig. 8—General view of foundry section of experimental foundry

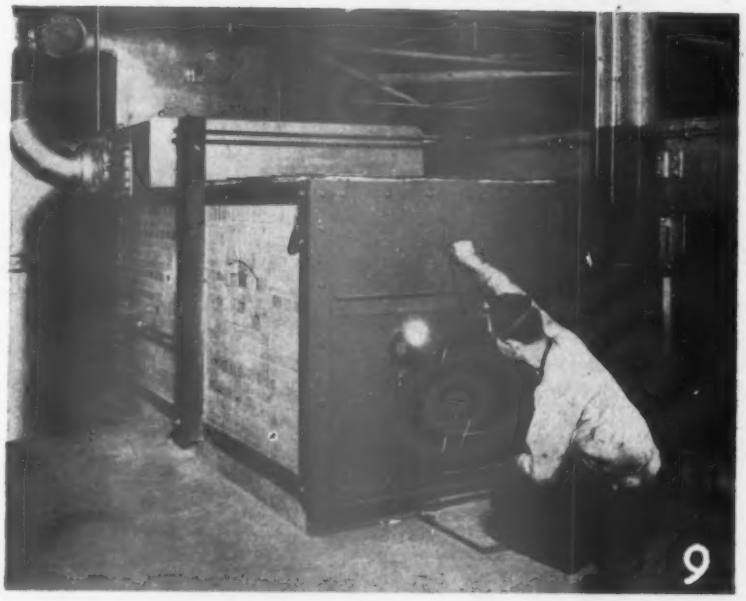
Fig. 9—Oil fired furnace used to preheat cupola blast

Fig. 10—Blast conditioning equipment at the experimental foundry

dustry's viewpoint is the development of new materials. Three outstanding new cast materials developed in recent years by this research organization are martensitic white iron, corrosion resistant austenitic iron and high strength gray iron. The exceptionally hard martensitic white iron is widely applied as abrasion resistant material and for large rolls. The austenitic irons are used extensively in oil refineries, pulp and paper mills, and in chemical and allied industries. The use of high strength iron for crankshafts, pistons and other highly stressed parts is well known.

Thus it is evident that the experimental research foundry serves the foundry industry in several ways. The special nature of its equipment permits it to investigate many problems that could not be solved in a production shop. Studies of fundamental features such as melting, solidification, and deoxidation assist in lowering costs by reducing the uncontrolled variables and, consequently, the number of rejections. The steady improvement in the common cast materials not only expands their market but also prevents their displacement by other methods of construction. Most important of all perhaps is the development of new materials. These, by offering novel and exceptional properties have opened markets for the foundry industry that might otherwise have remained inaccessible.

8


9

7

10

Plan To Use a Smaller Cupola

Q.—Under ordinary conditions we have melted iron in a 48-in. cupola, 2000 lb iron and 300 lb coke per charge. With a crane over all the floors it is our intention to extend the heat and have a few men pour all the iron while the molders continue molding all day. The new furnace is to be lined to 39 in. inside diameter. We shall appreciate your opinion on the proper size and number of tuyeres, weight of iron and coke charges, air volume and pressure, melting capacity per hour of high grade, hot stove plate iron. Will it be necessary to break the pigs into halves? The blower displaces 22 cu ft of air per revolution.

A.—The fact that the blower displaces 22 cu ft of air per revolution does not convey any information, since you do not give the number of revolutions per minute. A 39-in., inside diameter cupola operated properly has a melting capacity of 6 tons per hour. To melt this amount of iron requires 15,000 cu ft of air, or at the rate of 2500 cu ft per minute. This means approximately 125 revolutions per minute for the blower delivering air at a pressure of 10 oz through a main blast pipe at least 12 in. in diameter. For proper distribution the air from the blast pipe enters a wind belt or air chamber outside the cupola shell and enters the cupola through the tuyeres.

At one time or another every possible type of tuyere has been tried with varying degree of success. Air entering a cupola through any kind of tuyere will melt iron. Every melter is familiar with the fact that natural draft will cause the iron to dribble where the tuyere doors are left open for a prolonged period. For short heats, say ½ to 1 hr, three or four relatively small tuyeres will serve satisfactorily. For longer heats, presumably 3 hr in the present instance, a greater number of tuyeres is necessary to prevent chilling in the vicinity and the gradual building up of a slag bridge. Majority of modern melters favor a continuous tuyere connected through generous size openings to the wind belt. One of the advantages is simplicity of construction, an upper and lower cast iron plate in two or three sections with suitable standards about 12 in. apart, and with the plates about 4 in. apart. Suitable charge for a 39-in. diameter cupola is 1000 lb iron and 150 lb coke. It is not necessary to break the pigs.

Questions and Answers

Alloy for Glass Bottle Molds

Q.—We operate a plant in India and will appreciate any available information on alloy compositions suitable for glass bottle molds, and the method of preparing such alloys.

A.—Materials for glass molds must withstand thermal shock as well as hard service, and, as might be expected, a wide variety of compositions are employed with more or less success. One composition which is said to serve well contains 3.40 to 3.50 per cent total carbon, about 2.40 per cent silicon, 0.60 to 0.70 per cent manganese, 1.0 to 1.50 per cent nickel, 0.40 to 0.50 per cent chromium, and 0.45 to 0.55 per cent molybdenum. As a general rule, high carbon gray irons give the best results as they withstand thermal shock better than low carbon irons. The alloy previously mentioned is cast against a chill, and previous to use is annealed at 1450 F for 4 hours, and allowed to cool in the furnace. Another procedure is to use a cast nickel face on the mold which is backed up by pouring cast iron around it. The nickel face is made about ½-in. thick.

Should Lower Silicon Content

Q.—We have a gray iron job that calls for 30,000 psi tensile strength. The raw materials we have available include pig iron containing 2.73 per cent Si, 0.82 per cent Mn, and 0.44 per cent P; No. 1 paper machinery scrap and No. 1 heavy melting railroad scrap steel. Most of the castings weigh around 1000 lb and one weighs 6000 lb. Can you send us information on a suitable mixture which will meet the physical requirements?

A.—Although you did not state the section thickness of the castings, reference to weight indicates heavy section, and our guess would be that a composition containing about 1.50 per cent Si would serve satisfactorily. Since the Si content of your pig iron is rather high, it must be diluted by the additions of steel scrap and heavy gray iron scrap to bring it down to the desired range. An appreciable amount of steel scrap will be necessary to accomplish that object, probably not less than 25 per cent, and perhaps more—depending on whether or not you have heavy gray iron scrap, low in Si, available.

Tentatively, we suggest a mixture composed of 250 lb steel scrap, 150 lb of home scrap containing about 2.25 per cent Si, 200 lb of heavy gray iron scrap containing 1.50 per cent Si, and 400 lb of pig iron. That will result in a final iron containing about 1.60 per cent Si, and should meet easily the specification on tensile strength. By leaving out the home scrap and substituting more heavy scrap, the final Si will be around 1.50 per cent. Similarly, if the steel scrap is increased at the expense of any of the other components, the Si will be decreased accordingly, since to all intents and purposes for calculation, the steel contains no Si at all. However, you are on the ground, and know the approximate Si content of your available scrap. Hence, you will have to calculate the weights of the different components which will give you an iron containing between 1.50 and 1.60 per cent Si.

Gating System Is Responsible

Q.—We shall appreciate your opinion on the composition and the cause of the inclusion in the accompanying aluminum sample. The metal is melted in oil fired crucible type pit furnaces and poured from iron hand ladles at a temperature just high enough to run the castings. An attached free hand sketch shows the gating system. Metal analysis also is enclosed.

A.—There is nothing the matter with the metal. Appearance of the cut surface and the analysis are quite satisfactory. The gating system is responsible for the defect. According to the sketch, the metal is poured straight down a large side riser. The basic idea is sound, to have the hottest metal in the riser at the close of the pouring period. However, as with many other sound ideas, the application may be nullified by any one or a combination of trifling details. In the present instance the constant stream of metal falling into the pool at the bottom of the riser develops a certain amount of oxide, and to this is added small quantities of slag and sand. This ball of more or less frothy material floats and bobs around in the pool. It is too big to go through the gate but remains partly in and out at the entrance. The obvious remedy is to change the gating system to prevent the formation of slush in the well at the bottom of the riser. Pour the metal into a small sprue, connected to the riser near the bottom. Place a choke or a strainer core in the passage between sprue and riser.

Want To Use Stoveplate Scrap

Q.—We are having difficulty in obtaining machinery scrap, but have on hand a large quantity of stoveplate scrap. We are making hot water and steam radiators, and would like to use the stove plate scrap as part of the charge. Our pig iron contains 3.06 per cent Si, 0.029 per cent S, 0.572 per cent P, and 0.83 per cent Mn. Do you think that we could use from 300 to 350 lb of stoveplate scrap in a 1000-lb charge?

A.—With your present pig iron, a mixture of 50 per cent pig iron and 50 per cent scrap, or even 40 per cent pig iron and 60 per cent stoveplate scrap, should prove quite satisfactory for radiator castings. The usual analysis for this class of castings is Si 2.25 per cent, Mn 0.70 per cent, S under 0.10 per cent, P under 0.80 per cent, and TC under 3.50 per cent. The general run of stoveplate scrap will show approximately the same analysis. While the Si loss in the cupola runs from 20 to 25 points or 0.20 to 0.25 per cent, this loss is compensated for by the relatively higher Si content of the pig iron. In fact with the 50-50 mixture and with good melting practice, you can improve the strength of the metal, without sacrificing the machinability, by adding from 5 to 10 per cent steel scrap to the cupola charge.

Graphite Chills for Aluminum

Q.—We shall appreciate any information you may care to give, or any published reference we may consult, on the use of graphite as the chill part of a mold for aluminum castings.

A.—Very little information is available on the subject of graphite chills. We have known of instances where pieces of graphite electrodes have been used as chills in the production of worm gears where the outside rim or periphery of the gears was to be chilled. The usual practice is to use metal chills, but graphite has been used with good success where haste was a factor. The time necessary to procuring and machining iron chills could be reduced materially by cutting up pieces of electrodes. Special shaped pieces frequently are made from graphite because graphite is easily whittled to shape. Briefly, it may be said that graphite chills are not in common use. They fill an emergency gap where the standard method of preparing a metal chill is too slow, or where the cost of metal chills for one or for a limited number of castings is out of proportion to the other items of expense.

GANGWAY!

By J. A. Patterson

"I don't think th' old lady washed this spinach very good—there's sand in it!"

Slag Entering With Iron May Cause Trouble

Q.—We are forwarding a small piece cut from a gray iron casting which shows a peculiar type of defect. The casting is a plain ring with a small machining lug on the drag side and perfectly flat on the cope side. The defective area, a mass of small and large cavities, appeared in only one casting in a group. We also are wondering if it is possible to add too much flux to the cupola charge with resulting trapped slag flowing into the molds with the iron.

A.—Taking the questions in reverse order it is possible to produce an excessive and unnecessary amount of slag in the cupola and, of course, where a large amount of slag flows into the ladle, the danger that a certain amount will enter the mold with the iron, is greater than where only a small amount is present, and that small amount held back by a skimmer.

The mass of small cavities located in one area of the casting might have been caused by steam from a lump of wet sand, but since that is rather improbable, and further since the cavities show traces of slag, it is reasonably certain that a quantity of slag is responsible for the defect. In this instance the slag coagulated into a fluffy, gas-filled mass that floated until the top touched the cope face of the mold. The mass then remained fixed and the thin, almost transparent walls of the mass of bubbles were sufficiently strong to prevent breakdown by the surrounding metal. In this instance the presence of slag in the ladle is directly responsible for the defect, but indirectly the responsibility lies in the practice of pouring slaggy metal. Where the presence of slag is suspected —and usually it is easily seen—the ladle should be skimmed at least twice and some form of skim gate should be employed to admit metal to the mold.

Lack of Feed Results in Leaky Fittings

Q.—We are forwarding a fitting and a small section of an elbow with which we have trouble, due to inability to withstand pressure. Our present practice is to use a matchplate containing six half patterns with four in one group and two in the other connected to a single runner. One core forms the cavities in two castings, and the castings are gated individually from the runner. Present pouring temperature is about 1900 F but we have tried higher and lower temperatures without results. We have tried different core mixtures, varied the proportion of ingot metal and remelt, varied our molding procedure using larger gates and runners, but we do not seem to be able to obtain a satisfactory yield of good castings. Can you make any suggestions?

A.—Examination of defective casting forwarded to us would indicate that your trouble has nothing whatever to do with the items described in your letter except that of gating. You are not feeding these castings sufficiently to compensate for the shrinkage that takes place during solidification. This is definitely shown by fracturing the castings instead of machining them. We believe that you should include among the tests you make on your product the regular fracturing of a casting from each heat or at least from every second or third heat. Break the casting through several places and look at the color and structure of the fracture. You readily will recognize the metal which has been fed properly and that which has been improperly fed. Furthermore, this fracture test will show definitely when a heat has been gassed in the melting process and a gassed heat would give the same trouble through lack of resistance to the pressure test that you now experience as a result of improper feeding. We do not believe that the present gating will enable you to properly feed these castings. Therefore, you will have to turn the patterns around so that the gate may be attached to the heaviest section of the casting and the gate in turn connected with an adequate riser. One riser could be so arranged as to feed two castings but the risers would have to be higher than your present 3-in. cope would provide. You should use a 4-in. cope or possibly a 5-in. cope in order to give height to the risers to insure the necessary gravimetric pressure to force the metal to flow down the riser to the casting. Even the best provision for this proper feeding will be found inadequate at times when the metal is a little sluggish as for example the last part of the metal to be poured from a pot full, and therefore, do not expect the risers to be 100 per cent perfect in correcting your difficulty.

This open structure may be caused by either lack of feed due to no risers or poor riser arrangement or it may be caused by absorption of gasses during the melting process. The fracture test will show a slightly different appearance when it is the result of gassing as compared with that of lack of feed. Lack of feed will exhibit a fracture that is uniformly granular in structure but shows a rusty or discolored appearance in spots or through the center of the section. Gassing will result in small pear-shaped holes or pinholes as some call them, in that section that has been last to cool because the gas has been ejected by the first metal to cool and forced into that last to cool where it was trapped and produced these small bubbles. The bubbles may in some instances be somewhat discolored but usually are bright, whereas bubbles caused by pouring from cores or hard ramming of molds are invariably discolored on their inner surface and are usually globular in shape rather than pear-shaped.

Average Yield Does Not Give True Picture

Q.—Have you any information available on the average yield for sand castings made of brass, aluminum and stainless steel? By yield we mean the ratio of castings to total melt.

A.—We question seriously whether there are any authentic average yield figures for castings and melt. For example, there are many castings made which do not have to meet any requirements except perhaps for external appearance while others must undergo rigid inspection including x-ray, magnetic or black light. Consequently, in the former case the gating system would be the minimum to obtain the desired appearance while in the latter nothing would be spared to insure a solid casting free from any defect. Therefore, what might be termed an average yield in one might be twice that for the other—and it hardly would be truthful to add both averages together, divide that figure by two and call the result the average yield for both.

Possibly a compromise might be made by suggesting a range of yields for the different alloys you mention, and the following are offered for consideration: Brass—50 to 70 per cent; aluminum—30 to 40 per cent, and stainless steel—40 to 50 per cent.

Polishes Cast Aluminum Kitchen Utensils

Q.—We are operating a small aluminum foundry, and are making some cast kitchen utensils such as roasters. We would like to know the procedure for applying a high polish on the outside and inside surfaces. Also we make nameplates with raised letters on which the background is painted, and would like to obtain a high polish on the letters.

A.—Polishing of aluminum kitchen utensils and similar castings generally is divided into four steps of roughing, oiling, buffing and coloring. The first or roughing operation usually is employed on rough uneven or deeply scratched surfaces, and consists of using set-up wheels made of canvas or muslin disks fastened together by stitching, gluing or cementing. The face of the wheel is covered with glue and then coated with abrasive by rolling it in a trough containing the material. Abrasive may be 60 to 100 grit aluminum oxide or emery. The wheel is

(*Concluded on page* 118)

NICKEL increases their

Life Expectancy . . .

Useful life of sleeves, liners and similar parts cast in iron can be greatly lengthened by suitable additions of Nickel to a properly adjusted base mixture. Counsel and data to help you in the selection, fabrication and heat treatment of ferrous and non-ferrous metals is available upon request.

NICKEL
Cast Iron

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.

(*Concluded from page 116*)

dried carefully before use. Diameter of the wheel may vary from a few inches in diameter to 20 in. and the thickness from 1½ to 2 in. Wheel speed should be around 6000 surface feet per minute. Rough polishing is done dry although buffing tallow may be used.

Oiling is accomplished with felt or sheepskin wheels set up as previously described with 100 to 220 grit emery. Lubricant may be tallow, oil, beeswax or tallow composition. Generally two wheels are used, one with 100 grit abrasive followed by one with 220 grit abrasive. Buffing operation employs sewed muslin wheels to which the abrasive is applied in grease or stick form. The abrasive usually is tripoli mixed with tallow, stearic acid, paraffin, etc., and molded in a cake or stick.

Final operation of coloring is done with unsewed muslin or flannel wheels after the work is freed from previous grease by washing in a suitable solvent and drying in sawdust. Abrasive used is lime or soft silica which also is available in stick or cake form. Lime frequently is avoided because in the presence of moisture the alkaline abrasive particles may attack the metal surface. Wheel speed is increased to 7500 to 8000 surface feet per minute in this operation. Raised letters may be polished by use of the same type wheels as for utensils.

Specks in Casting May Be Caused By Gas

Q.—A casting made from 46 B5 brass ingot comparing to the 88-10-2 alloy appears to be solid when cast. However, on the last machine operation fine black specks appeared on the drag as well as on the cope side. The ingot has been examined by sawing in half and machining the sections, and there is no indication of impurities. Castings are polished highly and engraved, and although the marks are extremely minute, the castings are not acceptable. The inclusions appear to be very hard, and at times break the engraver's tools.

A.—Since the ingot apparently is free from the defect, the trouble must arise after melting. However, it might be pointed out that examination of only one ingot is of practically no value in determining the characteristics of a heat involving several thousands of pounds. Possibly you may be using the term ingot to denote the plural, and followed a definite sampling procedure to secure a representative number of ingots for examination.

Without a defective casting at hand for examination, it is rather difficult to make any definite pronouncement as to the exact cause of the specks. You state that they are hard and tend to break the engraver's tools. Possibly they may be minute pieces of undissolved iron or iron scale which come from using a metal skimmer on the pots. Then again they may be sand or other dirt washed into the mold, and which lodges just under the skin.

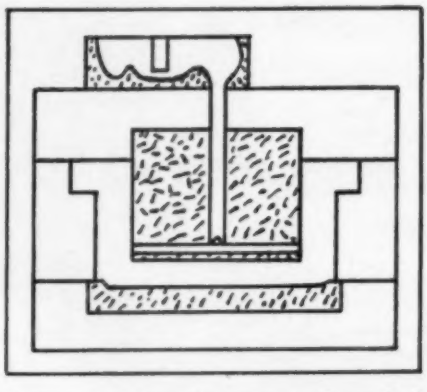
If the engraver's tools are small and fine, it is possible that they could be broken through striking discontinuities in the surface. In other words, if the small specks are holes filled with cutting or polishing compound, the tool might drop into the minute depression, and not having sufficient strength to withstand the pressure and impact of striking the opposite edge of the hole, breaks off. While that may seem a little far-fetched, just remember that the point of a needle is easily broken off.

As you undoubtedly know nonferrous alloys are quite susceptible to gas absorption, and being unable to eject all of the gas before solidification occurs, contain holes which vary in size from some hardly visible with a low power magnifying glass to those easily seen with the naked eye. Hence, it might be worthwhile to investigate melting conditions, and see that the metal is melted rapidly and not permitted to remain in the furnace any longer than necessary. Also the particular alloy must be poured at the proper temperature since it has a very limited pouring range.

Tiny Holes in Casting Result from Dirt

Q.—We are sending a gray cast iron casting which contains a number of small holes. Our sketch shows the pattern construction and pouring arrangement. The core print is made in the drag, the pattern proper is in the cheek and the cooler core is hung in the cope. Iron contains 1.85 per cent Si, 0.75 per cent Mn, 3.65 per cent TC, 0.38 per cent Ni, 0.50 per cent Cr, and .08 per cent Cu. Facing for the core is composed of 100 lb zircon sand, 1 pt core oil, 2/3 pt proprietary binder, and 1/4 pt water which is backed up with coarse core sand. After the cores are baked, they are sprayed lightly with a wash, heated slightly to dry them, and then they are set in the mold. After the iron is drawn from the cupola, it is placed in ladles previously warmed by hot iron, and left boil as long as possible. We find that these castings must be poured very hot.

A.—The core referred to in your inquiry produces a beautifully smooth and clean face on the casting. You can dismiss it from the list of variables responsible for the small holes. These holes are caused by small particles of slag and in one or two instances by sand grains. Evidence of slag also appears on the upper face of the casting. Apparently this floated on top of the iron and was carried up and pressed against the cope. Presence of slag indicates a certain amount of laxity in skimming and pouring. Presence of occasional sand grains shows the result of erosion at some point in the gating system.



Sketch showing the suggested method of gating to insure clean metal in the mold cavity

Your present gate which introduces metal at the bottom has many commendable features and might be continued if you introduce a skim core or dirt catcher at some point between the pouring basin and the entrance to the mold. The riser is unnecessary and simply represents wasted metal. Theoretically it is large enough and high enough, but the connection with the casting is so small that the metal freezes in it before it solidifies in either casting or riser.

The accompanying sketch shows a gating system which prevents the entrance of any foreign material through the gates. Part of the central sprue is formed in the cooler core. Two ½-in. rods at right angles to each other pass through the lower end of the gate pin. They are pulled out before the corebox is removed from the core. The sprue in the cope forms a continuation of the sprue in the core. The pouring basin may be made up in green sand, but a dry sand basin made in the core room is preferable. Metal is poured in the depressed end of the basin to form a pool and then flows under a dam where any scum is caught, and then flows to the sprue.

Forms Straight Holes in Small Brass Bushings

Q.—Our bushing stock patterns are mounted on boards and the castings are molded and poured in a horizontal position. The molds are made on a machine, in snap flasks reinforced with bands. We have trouble in getting straight holes through the ½, ⅝, ¾ and ⅞-in. sizes.

A.—Metal pressure and difference in specific gravity between sand and metal cause the long slender cores in small bushings to spring in the center. To counteract this tendency the cores in these castings are reinforced with pieces of steel rods. If the cores are made in a corebox, the wires or rods are incorporated in the sand. If the cores are made on an extrusion type machine, an extra large piercing point is employed to form the vent opening through the center. After the cores are dried a piece of square section rod is pushed into the opening. The four corners of the rod engage the wall of the vent opening, and yet leave enough space for the vent to escape. Tendency of the cores to spring in castings of this general type is reduced to a considerable extent by pouring the molds on an incline, say about 20 degrees from the horizontal.

"Our molders formerly spent about half their time riddling sand . . ."

-then came the Royer!

Before procuring the Royer "Jr." pictured above, Wagner Brass Foundry, Inc., Chicago, like many other nonferrous jobbing foundries, used gyratory riddles for sand conditioning. Only a small amount of sand could be handled at one time; which slowed up the molders and retarded production in general. As Mr. Otto Wagner, president, puts it: "Our molders used to spend about half their time riddling sand."

Today, with the Royer Sand Conditioner and Blender, it takes one man but a few minutes to condition enough sand to keep all the molders busy for hours. All the floor man has to do is to shovel the sand into the hopper. The machine does the rest.

Saving of time and labor is but one of the advantages which a Royer brings into a foundry. Properly conditioned sand is a must for good castings—ferrous or nonferrous. *Only the Royer provides these six essential steps to correct sand preparation: the elimination of contamination; reducing the sand to a smooth, even texture, free of lumps; proper blending of old sand, new sand and bond; correct distribution of moisture; increased permeability; and proper aeration.*

Over 6,900 Royers are now in service. There is a model and size for every foundry requirement. Send for Catalog 744 which shows the entire line and pictures of typical foundry installations.

The ROYER FOUNDRY Sand Conditioning EQUIPMENT

Get this book!

MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.
KINGSTON, PENNSYLVANIA

MEN of Industry

WALTER F. MORTON

WALTER F. MORTON, recently elected president of Rochester Chapter, AFA, is works manager, the Anstice Co. Inc., Rochester, N. Y. Following graduation from Hobart College in 1922, Mr. Morton assisted in research in the department of chemistry, New York Experimental Station, for 3 years. In 1925 he became plant chemist and metallurgist, the Anstice Co. Inc., was appointed chief metallurgist and factory manager in 1933 and works manager in 1944. Mr. Morton was a director of the Rochester Chapter last year. He is past chairman of the Rochester Chapter, American Society for Metals, and a member of the American Welding Society and American Society of Tool Engineers.

♦ ♦ ♦

W. GUY BAGLEY

W. Guy Bagley has been appointed assistant sales manager, Woodward Iron Co., Birmingham. Mr. Bagley formerly was associated with Republic Steel Corp., in its Birmingham office.

♦ ♦ ♦

Robert R. Haley, the 1945-46 president of the Southern California Chapter, AFA, is president of the Advance Aluminum & Brass Co., Los Angeles. In his chosen profession he is carrying on a trade in which both his father and grandfather participated and which his son, at present a captain in the Air Forces, likewise has followed. Active in the Southern California Chapter, Mr. Haley was elected treasurer last year but subsequently was named to fill a vacancy in the vice presidency.

♦ ♦ ♦

J. R. Cochran, recently elected chairman of Northern Illinois and Southern Wisconsin Chapter, AFA, is metallurgist in the Foundry Division, Sundstrand Machine Tool Co., Rockford, Ill. Mr. Cochran was graduated from University of Illinois in 1938 with a degree in chemical engineering. His previous connections include metallurgist, Hansell-Elcock Co., Chicago, and process control observer, Carnegie-Illinois Steel Corp., South Works, Chicago. He has been metallurgist at Sundstrand Machine Tool Co. for the last 6 years. An active member of the Northern Illinois and Southern Wisconsin Chapter, Mr. Cochran served as vice chairman last year.

♦ ♦ ♦

K. Rex Ford has been appointed general superintendent, General Foundries Co., Milwaukee. Mr. Ford had been associated since 1934 with the International Harvester Co., Milwaukee, as supervisor of labor relations, high production rigging and other capacities of a technical nature. Other connections include Caterpillar Tractor Co., Peoria, Ill., John Deere Tractor Wks., Waterloo, Iowa, and Swifts Mfg. Co., Milwaukee.

♦ ♦ ♦

August Rossetti, until recently in charge of production control at Union Steel Castings Division, Blaw-Knox Co., Pittsburgh, has been appointed plant manager, Columbia Radiator Co., McKeesport, Pa. Mr Rossetti attended specialized classes at Carnegie Institute of Technology, Antioch College and University of Dayton. After 8 years spent with Westinghouse in East Pittsburgh, where he worked on gray iron, steel and nonferrous metals, and later became chemist and assistant metallurgist, he joined the J. H. R. Division, Dayton Malleable Iron Co., Dayton, O., where he remained 11 years. For the last year and a half Mr. Rossetti has been with Union Steel Castings Division.

♦ ♦ ♦

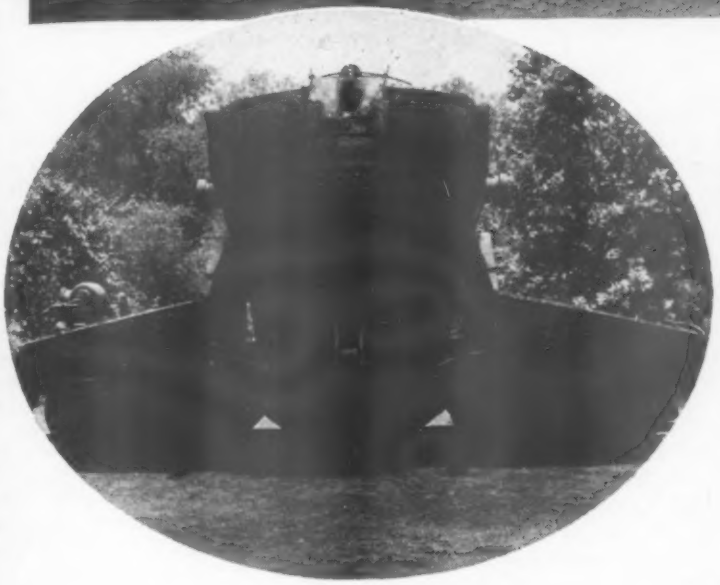
Maurice C. Taylor, formerly manager of research at the Niagara Falls Laboratories, the Mathieson Alkali Works, has been appointed resident director of research and development. **J. Douglas MacMahon,** until recently assistant man-

(*Continued on page* 122)

ROBERT R. HALEY

J. R. COCHRAN

K. REX FORD



Each Ladle Fills One Car

TOP—*These three ladles hold an entire cast from a furnace.*

BOTTOM—*This ladle is especially designed for complete, uniform mixing of one full carload of pig iron.*

BY using ladles that fill a single car with pig iron, Woodward provides additional insurance against variation in analysis.

This is one of many coordinated production practices combining to maintain the consistent uniformity in chemical and physical properties for which Woodward iron is nationally famous.

WOODWARD IRON COMPANY

WOODWARD, ALABAMA

Independent Since 1883

GENERAL SALES OFFICES

1515 FIRST NATIONAL BUILDING • BIRMINGHAM, ALABAMA • PHONE 4-6786

(*Continued from page* 120)

ager of the sales development department, has been named assistant to the technical director. C. N. Richardson, superintendent of pilot operations, becomes manager of research engineering. **G. Gerald Day,** a superintendent in the development department, has been made research and plant liaison engineer.

♦ ♦ ♦

Wallace F. Helies has been appointed assistant sales manager in charge of sales research and marketing, the Velsicol Corp., Chicago. Mr. Helies, who joined the company in October, 1944, was formerly associated with the chemical products division of the Standard Oil Co. of New Jersey. **Gus J. Mayer** has been appointed to handle general sales for the company in the new office for the Detroit area, recently opened in that city.

♦ ♦ ♦

H. J. French has resigned as assistant director for raw materials and facilities of the Steel Division, War Production Board, Washington, and has resumed his duties as assistant manager of the Development and Research Division of the International Nickel Co. Inc., New York. Mr. French joined the Iron and Steel Branch of WPB late in February, 1942, when he organized and became chief of the Metallurgical Section. With the formation of the Steel Division he became chief of the Metallurgical Branch and in March, 1944 was appointed assistant director.

♦ ♦ ♦

Aubrey M. Callis has been appointed sales manager of the Whiting, Ind., and Detroit plants, Federated Metals Division, American Smelting & Refining Co., with headquarters at Whiting. Formerly assistant general manager of the Pacific Coast department, with headquarters at Los Angeles, Mr. Callis has been associated with Federated since 1928 in sales and plant executive capacities.

♦ ♦ ♦

Leland I. Doan, for the last 16 years general sales manager, the Dow Chemical Co., Midland, Mich., has been made vice president and director of sales. Mr. Doan joined the company in 1917. He has been a vice president of the company since 1936 and secretary since 1941. **Donald Williams,** recently assistant general sales manager, succeeds Mr. Doan as general sales manager. Mr. Williams joined the Dow sales staff in 1924 as a member of the insecticides division and was in charge of Dowflake sales from 1929 to 1933. **Donald K. Ballman,** formerly manager of the technical service and development division of the company, succeeds Mr. Williams as assistant general sales manager. After his graduation from Indiana University in 1929, Mr. Ballman joined the Sears Cabinet Co., Indianapolis, returning to the university in 1934 for his master's degree in chemistry. He has been affiliated with Dow Chemical since 1935.

♦ ♦ ♦

Otto F. Seidenbecker, who resigned recently as vice president, Wisconsin Steel Co., Chicago, affiliate of International Harvester Co, has become associated with Chicago Steel Service Co., Chicago, as assistant to the president.

♦ ♦ ♦

Dan W. Moll, vice president and treasurer, Hills-McCanna Co., Foundry Division, and chairman of the Casting Division of the Magnesium Association, has been appointed official representative of that association on the executive committee of the Aluminum and Magnesium Division of the American Foundrymen's Association.

♦ ♦ ♦

F. E. Smith has joined the Vesuvius Crucible Co., Pittsburgh, as sales and service engineer. For the past 12 years Mr. Smith was connected with open hearth and electric steel production at the Canton and Chicago district plants of the Republic Steel Corp. and at the Atha, N. J., works of the Crucible Steel Co. of America.

♦ ♦ ♦

David L. Booker, for the past 12 years connected with the National Cast Iron Pipe Division of James B. Clow & Sons, Birmingham, and Coshocton, O., as metallurgist, has resigned to become associated with Thomas Foundries Inc., Birmingham.

♦ ♦ ♦

Maj. Charles H. Warner has been appointed manager of the Washington office of Clark Equipment Co., Buchanan, Mich. Major Warner, a native of Roseville, Ill., and a graduate of Northwestern University, served during World War II in the office of chief signal officer, Intelligence Section, and on the combined Chiefs of Staff. He was placed on inactive status by the Army last July.

♦ ♦ ♦

R. A. Lewis has retired as general manager of the Bethlehem, Pa., plant of Bethlehem Steel Co. He will continue in consulting and advisory capacity. **J. M. Sylvester** has been appointed general manager. **A. D. Shankland,** engineer of tests, succeeds Mr. Sylvester as assistant general manager.

♦ ♦ ♦

Lt. Col. H. A. Stevenson, general staff corps, Army Service Forces, has been retired to inactive duty and on Aug. 1 returned to his former business in association with Ray A. Bowen as distributor in the Michigan territory for Baker Industrial Truck Division of the Baker-Raulang Co., Cleveland.

♦ ♦ ♦

E. D. Wasker, for the last 8 years general sales manager of the C. J. Tagliabue Division, Portable Products Corp., Brooklyn, N. Y., has been appointed general manager. He has been associated with the company for 22 years.

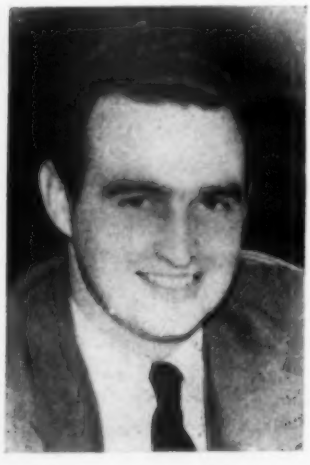
♦ ♦ ♦

Gordon I. Lindsay Jr., formerly foundry sales manager of the Robeson Process Co., New York, was promoted from sergeant to second lieutenant in the United States Marine Corps, receiving a field commission at the conclusion of the Okinawa campaign in which he participated.

♦ ♦ ♦

Robert V. Lackner has been appointed field engineer, Allis-Chalmers Mfg. Co., Pittsburgh district office. A native of Pittsburgh, Mr. Lackner attended schools there and was graduated from Carnegie

(*Concluded on page* 126)



WALLACE F. HELIES

H. J. FRENCH

AUBREY M. CALLIS

THE LAST DROP IS AS GOOD AS THE FIRST

Ask the Men Who Use It!

I'LL TAKE THE JOB WITH THE WHITE SIDEWALL TIRES!

Sure you will...if you can get it! And, one of these days you can be choosy about your new car. You can be choosy NOW ...about Core Oil...just ask for DAYTON OILS and be sure of getting the best in dependability and uniform quality. Don't take our word for it... ask one of your foundry friends... he's probably using DAYTON OILS!

The DAYTON OIL COMPANY

DAYTON 1, OHIO

STEEL CORE AND MOLD WASHES - BINDER AND CORE PASTE - CORE WASHES - CHILL COATINGS

SAFETY
is problem No. 1
in Mining

Mining has always contained certain elements of danger from natural and mechanical causes. In recent years most of these hazards have been overcome, or at least minimized, by the application of rigid safety measures and by using equipment that is designed and built for safe, positive operation. But the search for improvement continues without ceasing. An example of this is cited below.

WHEELABRATING
facilitates inspection of parts
FOR MINE MACHINERY BUILDER

A company that has pioneered in the design and manufacture of hoisting equipment for shaft mines, is the Ottumwa Iron Works, established in Ottumwa, Iowa, in 1867.

Ottumwa mine hoists are fully equipped with safety devices, so that the possibility of failure is reduced as much as human ingenuity can make it.

WHEELABRATING EXPOSES DEFECTS

In the manufacture of these hoists every part is subjected to rigid inspection. It is one of the advantages of the Wheelabrator Swing Table that the castings used are perfectly cleaned right down to virgin metal, so that defects are immediately discernible.

The same Wheelabrator is used by this concern for cleaning such work as hoist drums, mine car wheels, gear housings, and machine brackets. Castings up to 800 lbs. are being handled in this machine.

CLEANING COSTS CUT 25%

Added benefits through the use of the Wheelabrator include improved machinability and a saving of 25% in cleaning costs over the previous method.

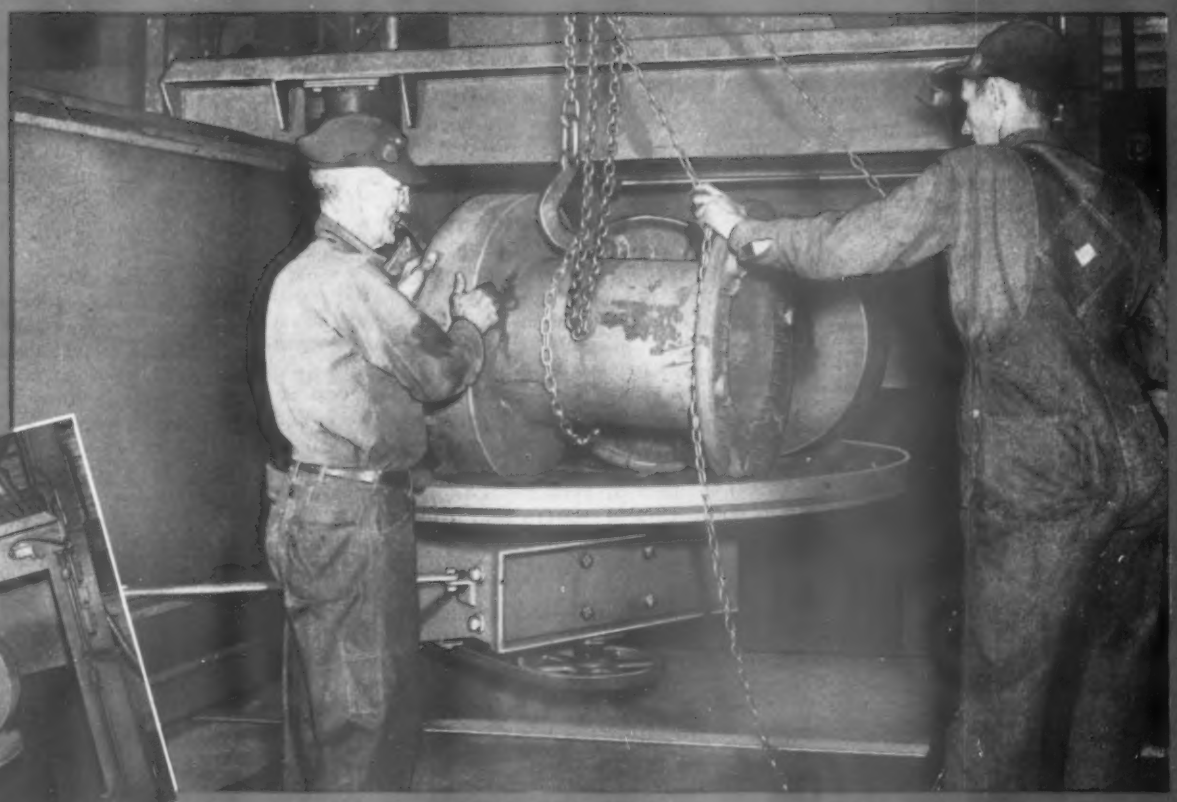
The success of the Wheelabrator on this application has again proved the ability of *American* to supply equipment that provides top performance at low cost.

American

FOUNDRY EQUIPMENT COMPANY

505 S. BYRKIT STREET — MISHAWAKA, INDIANA

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT



Loading drum castings, 32" high, 27" in diameter and weighing 300 pounds, onto the work table of the Wheelabrator Swing Table installed at Ottumwa Iron Works.

Two large steam drum winches are shown on the 60" work table ready for entry into the Wheelabrator Swing Table for blast cleaning.

THE WHEELABRATOR SWING TABLE

—A NEW DEVELOPMENT

The Wheelabrator Swing Table is a recent adaptation of the airless Wheelabrator unit which permits the blast cleaning of a varied production of parts. Opening the door of the machine brings the work table into position for loading or unloading. Closing the door brings the table beneath the blast of one of more Wheelabrator units. The table rotates within the blast stream so that all surfaces and cored areas are scoured to a bright, clean finish.

OPERATES with SPEED and ECONOMY

The speed and economy of the Swing Table makes it an ideal unit for cleaning large, intricate pieces that normally would have to be laboriously blasted in an airblast room. It is designed for the shop that needs moderately priced equipment capable of handling a wide range of large and small pieces where daily production does not warrant the purchase of several different types of cleaning equipment.

Write for full details today!

(*Concluded from page* 122)

Institute of Technology. Following an association of one year with the Pennsylvania Railroad, he acted as a consulting engineer for 2 years. In 1936 he joined Carnegie-Illinois Steel Corp. and spent 9 years at its Duquesne Works.

♦ ♦ ♦

Charles E. Dixon Jr., formerly chemical engineer with Turco Products Inc., has been appointed vice president and general manager of the Western division, Phillips Chemical Co., Chicago. **Dr. Meyer Agruss** has been named national general manager of the company.

♦ ♦ ♦

Arthur S. Klopf, until recently manager of the iron division, Firegan Sales Co., Chicago, has joined Lester B. Knight & Associates, Chicago, foundry consultants and engineers. Mr. Klopf

ARTHUR S. KLOPF

has had long experience in the foundry industry. For several years he was vice president and manager, foundry division, Hansell-Elcock Co., Chicago, and previously had been foundry superintendent, Kearney & Trecker Corp., Milwaukee. He is a former chairman of the Chicago Chapter, AFA.

♦ ♦ ♦

Clarence L. Williams has joined the Foxboro Co., Foxboro, Mass., as sales engineer in the New York office of that company. He has been assigned to the northern New Jersey territory. Mr. Williams is a graduate of Stevens Institute of Technology.

♦ ♦ ♦

Joseph J. Glass, formerly Buffalo plant manager and sales representative, American Brake Shoe Co., New York, has been appointed sales manager, Small Steel Castings Inc., Buffalo. Officers of the latter include: **Joseph Cheney,** president; **Joseph Spriesch,** vice president and treasurer; and **Mrs. Marion Cheney,** secretary.

♦ ♦ ♦

C. S. Anderson, president, Belle City Malleable Iron Co., and Racine Steel Casting Co., Racine, Wis., has been appointed honorary vice chairman for National Bible Week, October 15-21, sponsored by the Laymen's National Committee.

♦ ♦ ♦

F. W. Elya has been appointed district manager of the Abrasive Division, in the newly created northeastern district, by Norton Co., Worcester, Mass. Mr. Elya's headquarters will be in Worcester, the territory comprising Massachusetts, Rhode Island, Vermont, New Hampshire, Maine and New York, with the exception of southeastern and southwestern counties. He has been associated with Norton Co. for 33 years and for the last 20 years has been abrasive engineer for western New York with headquarters in Rochester. **R. J. Forkey,** who has been abrasive engineer in Syracuse territory, succeeds Mr. Elya in western New York. **Robert Cushman,** formerly in the Worcester office, has taken over Mr. Forkey's territory.

♦ ♦ ♦

George E. McGuire has been appointed director of foreign sales, Carborundum Co., Niagara Falls, N. Y. In 1911 Mr. McGuire joined the New York district sales office of the Company, and has been sales manager of the export department for the last 9 years.

♦ ♦ ♦

William C. van Cleaf has been appointed director of industrial relations, Allis-Chalmers Mfg. Co., Milwaukee, succeeding **Lee H. Hill.** Mr. van Cleaf joined the company in 1912 as an electrical apprentice, serving subsequently as general supervisor of apprentice training, employment manager and later assistant to Mr. Hill.

♦ ♦ ♦

Allan L. McKay, vice president and general manager, Kaukauna Machine Corp., Kaukauna, Wis., since 1942, has been elected president. Mr. McKay succeeds **Ralph J. Kraut** who has resigned as president of Kaukauna Machine Corp., to become president and general manager, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.

♦ ♦ ♦

John Howe Hall has resigned as assistant metallurgist of General Steel Castings Corp., Eddystone, Pa., to resume consulting metallurgical practice. For many years associated with Taylor-Wharton Iron & Steel Co., High Bridge, N. J., Mr. Hall in 1937 formed his own consulting business, but later joined General Steel He will continue to serve the latter in a consulting capacity.

♦ ♦ ♦

C. E. Mason has been appointed technical director, the Bristol Co., Waterbury, Conn. A graduate of Marietta College, Mr. Mason from 1925 to 1941 was associated with the Foxboro Co., and prior to joining the Bristol Co. he was director of engineering, Mason-Neilon Regulator Co.

♦ ♦ ♦

A. E. Whitney has been made vice president and general sales manager, Herbert H. Davis Co., Cicero, Ill. Mr. Davis until recently was sales manager of the heater department, Dravo Corp., Pittsburgh. Prior to that he was associated with the Iron Fireman Mfg. Co., Cleveland, for 12 years.

♦ ♦ ♦

A. J. Fruchtl, formerly affiliated with Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., has joined the U. S. Pipe & Foundry Co. at its general office in Burrlington, N. J.

♦ ♦ ♦

J. Robert Walsh, purchasing agent for the Cletrac Division of the Oliver Corp., Cleveland, has been appointed director of purchases of the corporation with headquarters in Chicago. He succeeds the late Harry S. Clay.

♦ ♦ ♦

Morton I. Dorfan has been appointed manager of the dust and fume engineering division, American Foundry Equipment Co., Mishawaka, Ind. Following graduation from Columbia University Mr. Dorfan spent several years abroad

MORTON I. DORFAN

in postgraduate study, followed by service as captain in the Ordnance Department during World War I. Since then he has specialized entirely in dust and fume control engineering. Former connections include Allis-Chalmers Mfg. Co., Blaw-Knox Co., and Pangborn Corp. Since 1941 he has been engaged in private consulting engineering.

♦ ♦ ♦

Dudley E. Chambers has been appointed executive engineer of the General Electric Research Laboratory, succeeding **Dr. Laurence A. Hawkins** who is retiring. Mr. Chambers was graduated from Leland Stanford University and entered the research laboratory of General Electric Co., Schenectady, in 1928.

♦ ♦ ♦

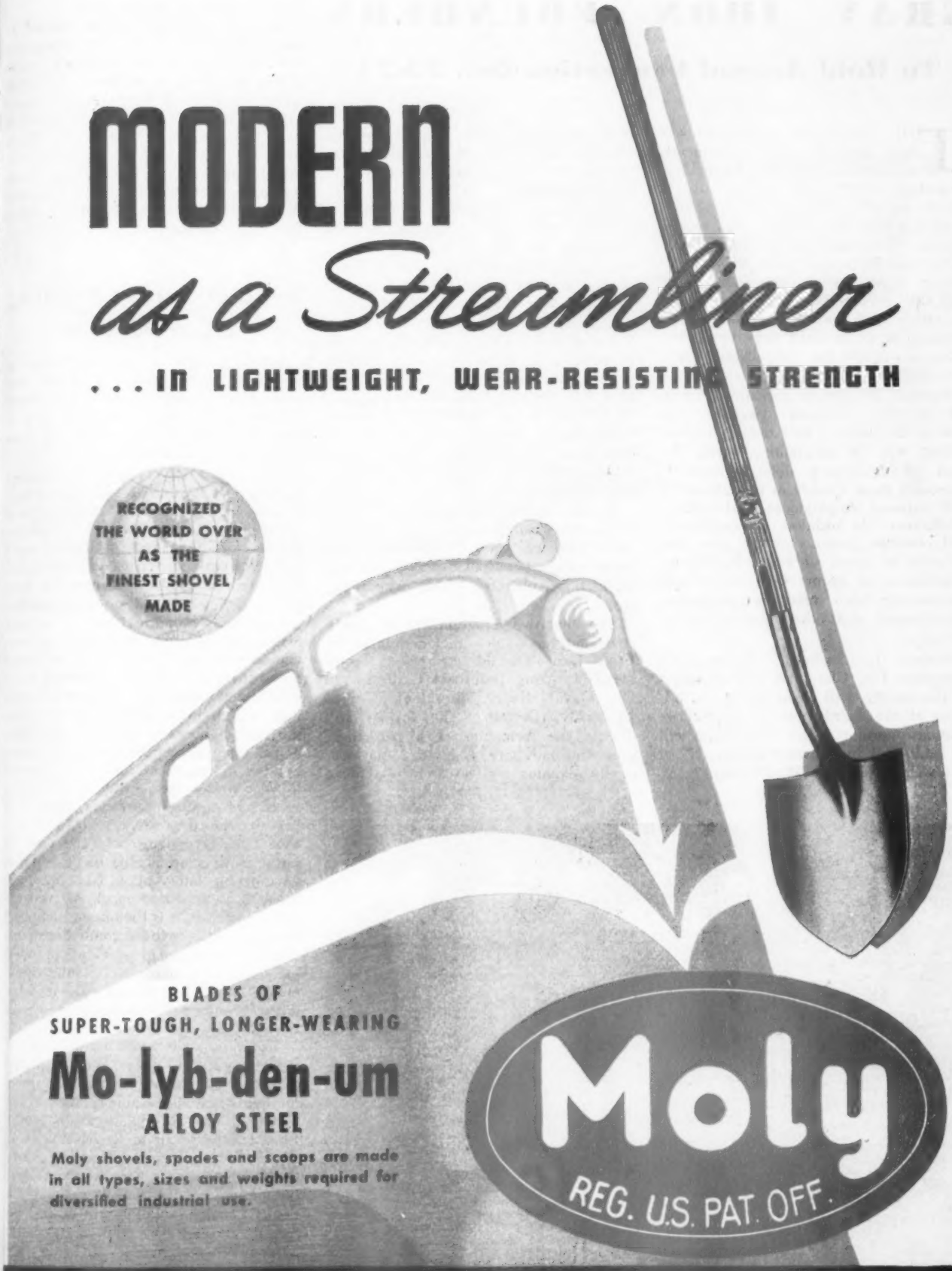
L. F. Lottier, for the past 12 years assistant metallurgist, Peoples Gas Light & Coke Co., Chicago has become metallurgist, Accurate Steel Treating Co., Chicago.

♦ ♦ ♦

John M. Bubenheim, formerly electric furnace melter, Ohio Steel Foundry Co., Lima, O., has become associated with Union Spring & Mfg. Co., New Kensington, Pa.

MODERN *as a Streamliner*

. . . IN LIGHTWEIGHT, WEAR-RESISTING STRENGTH



RECOGNIZED THE WORLD OVER AS THE FINEST SHOVEL MADE

BLADES OF
SUPER-TOUGH, LONGER-WEARING
Mo-lyb-den-um
ALLOY STEEL

Moly shovels, spades and scoops are made in all types, sizes and weights required for diversified industrial use.

Moly
REG. U.S. PAT. OFF.

WOOD SHOVEL AND TOOL CO. PIQUA OHIO
A NATIONAL ORGANIZATION *SPECIALIZING EXCLUSIVELY*
IN SHOVELS, SPADES AND SCOOPS

GRAY IRON FOUNDERS

To Hold Annual Convention Oct. 23-24

THE seventeenth annual convention and Peacetime Production Conference of the Gray Iron Founders' Society will be held at the Hotel LaSalle, Chicago, Oct. 23-24. Realizing that the industry, still operating far below capacity because of manpower shortages and other problems, is facing a peacetime demand which will take several years of heavy output to satisfy, the society is planning the meeting so as to assist gray iron foundries to prepare for their biggest business potential in history.

Current production difficulties, created by the manpower-starved condition of the industry and unremunerative prices, will be re-examined with the view of developing definite steps to overcome them quickly in the interest of full national employment and civilian production. In addition, the conference will consider progress of the gray iron industry in terms of research, the establishment of proper methods of cost accounting, labor relations, production management and other matters of interest.

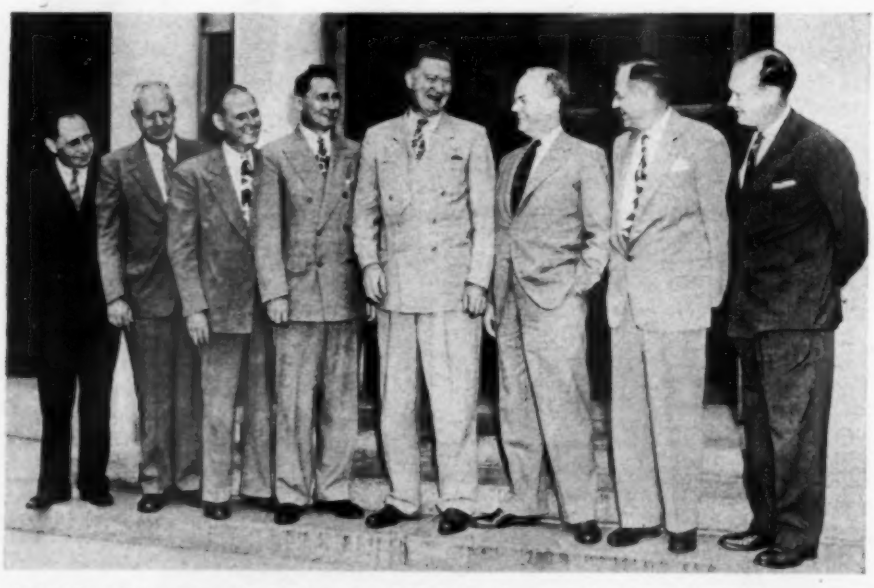
Walter L. Seelbach, Forest City Foundries Co., Cleveland, and president of the society, will make his annual address at the opening of the conference Tuesday morning. This session also will be addressed by Howard Taylor, Naval Research Laboratory, Washington; E. L. Roth, Motor Castings Co., Milwaukee, chairman of the society's technical committee, and will include a discussion of cost accounting.

The Tuesday luncheon, to feature a speaker of national prominence, also will be the occasion for honoring six men who assisted government and industry during wartime through their service with the War Production Board. These men are: E. P. Buchanan, Pittsburgh Coke & Iron Co., Pittsburgh; A. D. Hannah, chief, Castings and Forging Branch, WPB; E. C. Hoenicke, Eaton Mfg. Co., Detroit; William Kerber, Hanna Furnace Corp., Buffalo; D. J. Reese, International Nickel Co., and F. G. Steinebach, THE FOUNDRY. The afternoon session will be devoted to a discussion of labor relations.

Another session will be given over to production management and will include talks on plant "conditioning" for more efficient output, quality control, production planning and scheduling, etc.

The tentative program for the two-day conference also includes talks by Brig. Gen. Donald Armstrong, commandant, Army Industrial College, and Dr. David Henry, president, Wayne University, Detroit. The former will discuss the formation of a permanent gray iron advisory committee on economic planning and research as a move toward national preparedness.

Six new directors will be elected to three-year terms at the concluding session. Selections by the nominating committee for the posts include: A. R. Enquist, Connecticut Foundry Co., Rocky Hill, Conn.; H. S. Faust, Hansell-Elcock Co., Chicago; E. C. Hoenicke, Eaton Mfg. Co., Detroit; J. O. Jackson, Jackson Industries Inc., Birmingham; C. R. McGrail, Texaloy Foundry Co., San Antonio, Tex., and E. B. Smith, American Brake Shoe Co.



Officials of the Gray Iron Founders' Society shown with John W. Snyder, director, Office of War Mobilization and Reconversion, on steps of the White House following discussion of the gray iron industry's role in reconversion. Left to right: William Haber, director, Manpower Liaison and Co-ordination Division, OWMR; H. S. Washburn, Plainville Casting Co., Plainville, Conn.; E. C. Hoenicke, Eaton Mfg. Co., Detroit; C. R. Culling, Carondelet Foundry Co., St. Louis; H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J.; John W. Snyder; W. L. Seelbach, Forest City Foundries Co., Cleveland; E. L. Roth, Motor Castings Co., Milwaukee

Seek Broader Casting Distribution

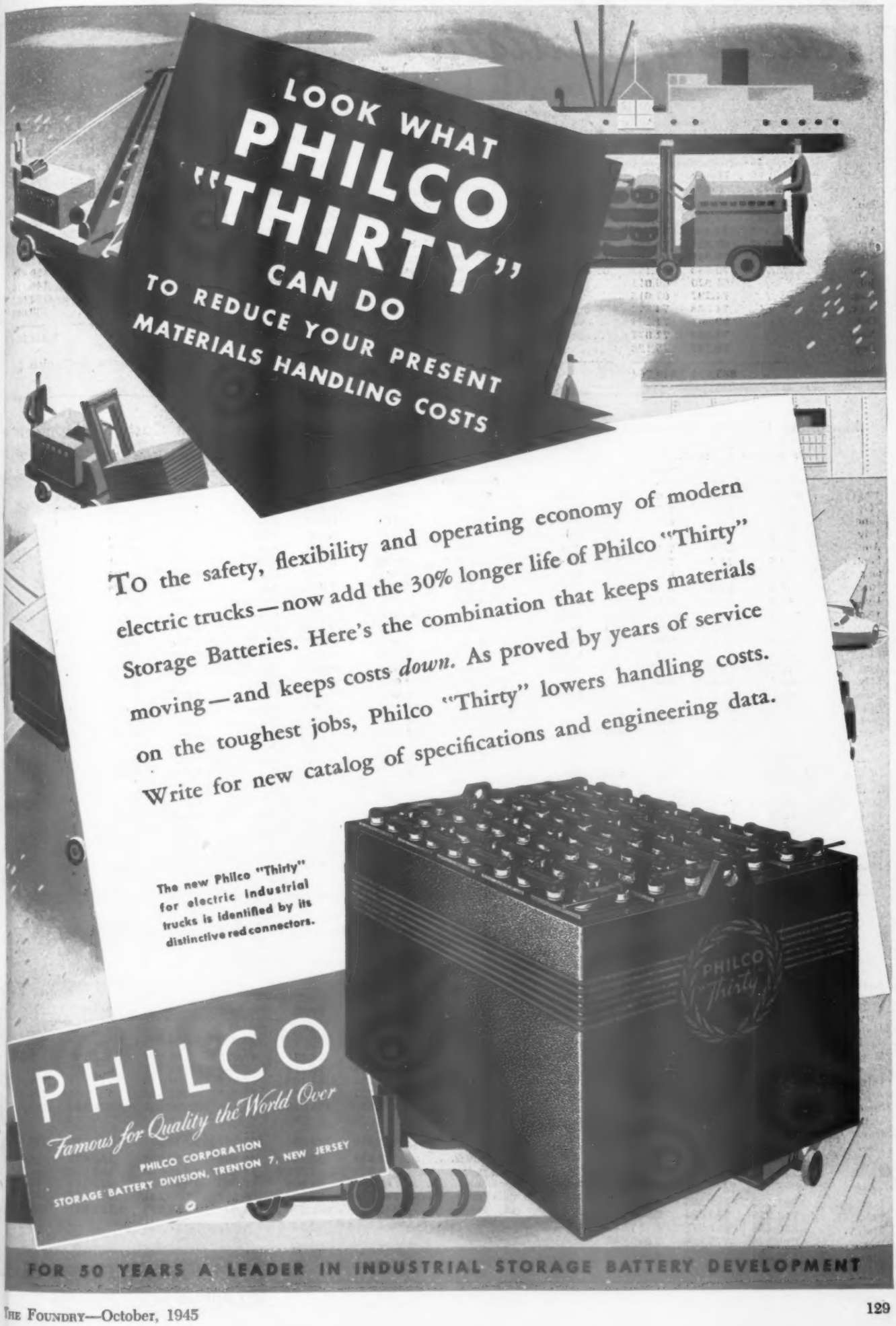
In the interest of speeding the reconversion program producers of gray iron castings are being urged by government officials and industry representatives to apportion their output among as many consumers as possible.

Officials of the Gray Iron Founders' Society, in a Washington conference Sept. 7 with John W. Snyder, director, Office of War Mobilization and Reconversion, pointed out the effect of the industry's problems on reconversion in general, and requested assistance in correcting manpower difficulties and price inequalities.

Gray iron foundries, and to a lesser extent malleable iron foundries, are overloaded with work and stymied by inadequate manpower in their attempts to attain higher production. Meanwhile, castings are urgently needed in many industries in the early stages of the return to full-scale peacetime operations, and a number of manufacturers have appealed to Washington for assistance in locating sources of castings. However, since WPB has abandoned practically all of its wartime priority system, only the new CC rating now is applicable to cases where government intervention is necessary to break a serious bottleneck in reconversion. Moreover, it is the announced policy that this rating is to be granted sparingly, since its widespread applicatioin would merely mean that some consumers would obtain material at the expense of others whose requirements probably are equally urgent.

The alternative suggested is for foundries voluntarily to spread their production as evenly as possible so that all consuming industries will be able to make at least a limited start in civilian goods production. The next four to six months are expected to be a highly critical period from the standpoint of gray iron casting supply; by the end of that time it is hoped that demand and production will be in better balance through correction of the current manpower situation.

On Sept. 12, OPA announced an amendment to its price regulation covering gray iron castings, the revision resulting in a 10 per cent increase, effective Sept. 17, in maximum prices for castings frozen at base-period levels. This advance affects castings which are either identical with, or substantially the same as, castings the seller sold or offered for sale during the period Aug. 1, 1941 to Feb. 1, 1942.


LOOK WHAT
PHILCO
"THIRTY"
CAN DO
TO REDUCE YOUR PRESENT
MATERIALS HANDLING COSTS
To the safety, flexibility and operating economy of modern electric trucks—now add the 30% longer life of Philco "Thirty" Storage Batteries. Here's the combination that keeps materials moving—and keeps costs *down*. As proved by years of service on the toughest jobs, Philco "Thirty" lowers handling costs. Write for new catalog of specifications and engineering data.
The new Philco "Thirty" for electric industrial trucks is identified by its distinctive red connectors.
PHILCO
Famous for Quality the World Over
PHILCO CORPORATION
STORAGE BATTERY DIVISION, TRENTON 7, NEW JERSEY
PHILCO Thirty
FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

Foundry Statistics

Malleable Iron Castings

	Production (Tons)			New Net Orders (Tons)		
	1945	1944	1943	1945	1944	1943
Jan.	83,742	75,594	63,572	97,153	93,855	73,524
Feb.	78,385	74,812	66,401	79,913	79,332	87,728
Mar.	86,175	81,480	78,143	98,979	90,038	85,744
Apr.	77,042	69,820	72,559	78,075	88,169	74,241
May	83,013	70,535	69,959	83,421	92,285	77,768
June	71,783	70,993	69,111	35,603	103,692	78,289
July	.....	61,320	66,011	.....	106,626	91,653
Aug.	.....	74,297	67,615	.....	71,307	108,565
Sept.	.....	74,628	74,874	.....	49,502	99,911
Oct.	.....	80,505	74,254	.....	76,536	101,510
Nov.	.....	79,629	72,077	.....	48,149	93,370
Dec.	.....	76,187	73,188	.....	69,972	81,978
Total	.....	889,820	849,764	.....	969,483	1,064,224

Steel Castings

	Shipments (Tons)		Production (Tons)		New Net Orders (Tons)	
	1945	1944	1945	1944	1945	1944
Jan.	201,162	237,570	157,176	159,795	210,182	167,739
Feb.	186,364	211,958	146,165	161,359	214,408	173,592
Mar.	211,890	224,913	166,896	174,626	203,170	162,575
Apr.	190,166	204,279	150,281	135,778	177,707	175,053
May	186,376	210,360	143,092	161,783	89,790	176,993
June	167,140	200,237	125,126	157,444	130,152	181,816
July	.....	176,735	.....	131,940	.....	169,921
Aug.	.....	204,833	.....	154,911	.....	171,309
Sept.	.....	189,443	.....	144,458	.....	129,847
Oct.	.....	197,772	.....	150,719	.....	146,116
Nov.	.....	196,475	.....	146,411	.....	120,667
Dec.	.....	190,846	.....	144,162	.....	138,666
Total	.....	2,435,421	.....	1,843,386	.....	1,914,294

Note: Shipments for sale and own use; production and orders for sale only.

Aluminum Casting Shipments

(In millions of pounds)

	Total	Sand	Perm. Mold	Die
1943	459.5	301.2	89.6	65.7
May	37.7	25.0	7.7	5.0
June	36.3	24.1	6.9	5.3
July	37.2	24.7	7.1	5.4
Aug.	38.2	25.4	7.2	5.6
Sept.	40.8	27.2	7.9	5.7
Oct.	42.7	28.5	8.0	6.2
Nov.	43.0	28.5	8.3	6.2
Dec.	41.4	27.3	8.1	6.0
1944	514.5	321.1	106.3	84.2
Jan.	44.1	29.4	8.3	6.4
Feb.	45.9	30.2	8.0	7.5
Mar.	49.5	31.4	9.6	8.1
Apr.	42.9	27.0	8.3	7.3
May	44.7	27.9	8.9	7.5
June	42.4	25.9	8.8	7.4
July	38.7	24.5	7.7	6.2
Aug.	43.2	26.9	9.2	6.9
Sept.	41.5	25.5	8.9	6.9
Oct.	42.1	25.1	9.8	7.0
Nov.	40.5	24.3	9.6	6.4
Dec.	39.0	23.0	9.2	6.6
1945				
Jan.	43.5	25.3	10.6	7.3
Feb.	42.0	24.9	9.7	7.2
Mar.	48.2	27.7	12.2	8.1
Apr.	43.8	24.8	11.1	7.7
May	41.4	22.7	10.9	7.6
June	37.3	19.5	10.1	7.4

Foundry Equipment, Supplies

(In thousands of dollars)

	Shipments	Orders	Back-logs
1943	53,806	32,094	.....
May	4,718	1,774	10,513
June	4,825	2,319	9,017
July	4,017	2,405	8,345
Aug.	3,513	1,989	7,429
Sept.	3,881	2,070	6,930
Oct.	3,792	3,401	7,092
Nov.	3,563	3,422	7,076
Dec.	3,217	3,786	7,731
1944	41,914	44,903	.....
Jan.	3,336	3,515	7,910
Feb.	3,426	4,338	8,822
Mar.	3,679	4,370	9,513
Apr.	3,496	2,424	8,441
May	3,547	4,089	8,983
June	3,554	3,506	9,335
July	3,027	3,086	9,394
Aug.	3,818	4,115	9,691
Sept.	3,445	3,465	9,711
Oct.	3,758	4,293	10,216
Nov.	3,451	3,401	10,196
Dec.	3,377	3,912	10,731
1945			
Jan.	3,355	3,631	11,007
Feb.	3,548	4,103	11,562
Mar.	3,804	5,247	13,005
Apr.	3,685	2,678	11,997
May	3,741	3,778	12,034
June	3,724	3,399	11,709

Magnesium Casting Shipments

(In thousands of pounds)

	Total	Sand	Perm. Mold	Die
1943	65,967	59,123	3,978	2,866
May	5,263	4,652	343	268
June	4,690	4,159	296	235
July	4,940	4,406	290	244
Aug.	5,238	4,770	257	211
Sept.	6,008	5,391	390	227
Oct.	6,774	6,096	431	247
Nov.	6,792	6,068	452	272
Dec.	6,840	6,220	382	238
1944	83,979	75,221	6,396	2,362
Jan.	6,984	6,210	536	238
Feb.	7,293	6,603	469	221
Mar.	8,242	7,574	496	172
Apr.	7,520	6,922	413	185
May	7,357	6,664	514	179
June	6,535	5,729	598	208
July	6,481	5,653	656	172
Aug.	6,934	6,143	563	228
Sept.	6,945	6,147	606	192
Oct.	6,738	6,062	515	161
Nov.	6,639	5,919	521	199
Dec.	6,315	5,595	509	207
1945				
Jan.	7,005	6,149	609	247
Feb.	6,707	5,832	658	217
Mar.	7,664	6,700	683	281
Apr.	7,053	6,257	614	182
May	6,794	6,081	525	188
June	5,521	4,878	429	214

GRAY IRON CASTINGS—Production, Shipments and Unfilled Orders in Tons

1944	Production	Shipments	Unfilled Orders
Jan.	793,884	765,423	2,259,158
Feb.	772,764	764,369	2,145,027
March	840,890	828,648	2,184,268
April	765,784	757,880	2,159,280
May	789,007	790,674	2,204,572
June	765,581	763,459	2,213,183
July	698,418	689,744	2,313,645
Aug.	778,388	778,205	2,335,194
Sept.	768,661	744,954	2,304,323
Oct.	788,196	780,453	2,296,690
Nov.	769,734	760,383	2,300,350
Dec.	743,710	741,534	2,474,548
Totals	9,275,017	9,165,726	.....
1945			
Jan.	807,130	791,395	2,496,928
Feb.	752,935	752,266	2,562,076
Mar.	830,653	857,616	2,713,656
Apr.	768,588	773,988	2,640,642
May	806,297	798,053	2,602,986

By Type—Latest Months Reported

	Production	Shipments Total	Shipments For Sale	Unfilled Orders Total	Unfilled Orders For Sale	Unfilled Orders For Own Use
May, 1945						
Total	806,297	798,053	493,698	2,602,986	1,829,754	773,232
Pressure pipe, fittings	53,746	51,421	47,973	162,994	157,230	5,764
Soil pipe, fittings	15,718	16,422	16,422	155,521	155,521	.....
Chilled car wheels	86,255	84,104	77,872	259,715	247,121	12,594
Molds for steel ingots	171,772	170,868	80,263	322,418	191,023	131,395
All other gray iron	478,806	475,240	271,168	1,702,338	1,078,859	623,479
April, 1945						
Total	768,588	773,988	481,237	2,640,642	1,844,188	796,454
Pressure pipe, fittings	47,285	50,340	46,892	156,388	150,027	6,361
Soil pipe, fittings	13,929	14,698	14,698	146,756	146,750	...
Chilled car wheels	81,280	83,900	76,060	246,991	229,113	17,878
Molds for steel ingots	160,772	163,474	80,287	334,231	196,655	137,576
All other gray iron	465,232	461,576	263,300	1,756,276	1,121,637	634,639

WPB figures reported by Bureau of the Census

Each One Matches the One that Tested Perfect

Finding a portable snagging wheel that perfectly suits your requirements . . . and then failing to get those exact specifications duplicated on repeat orders . . . is a nuisance that wastes time and affects quality of work.

That's why so many firms have changed over to Bay State. An exclusive method of controlling porosity for fast, cool cutting . . . and special Bay State resinoid or vitrified bonds . . . combine to give you exactly the results you want . . . the first time and ever after.

DUAL-PURPOSE SNAGGING WHEELS

Bay State's "wheel within a wheel" is used for both floor stand and swing frame service. At its larger diameter it is constructed for floor stand use; when reduced to the smaller diameters, its characteristics are right for the generally more severe swing frame work.

Write for bulletin giving full details about Bay State Snagging Wheels.

BAY STATE ABRASIVE PRODUCTS CO.
7 Union Street, Westboro, Mass.

BAY STATE

ABRASIVE PRODUCTS

Top Performance Consistently Duplicated

GRINDING WHEELS · HONING AND SUPERFINISHING STONES · PORTABLE SNAGGING WHEELS
MOUNTED WHEELS AND POINTS · CUT-OFF WHEELS · INSERTED-NUT DISCS · AND CYLINDERS

AFA 50th Anniversary Convention

To Be Held in Cleveland Next May

Cleveland Public Auditorium, scheduled to be site of 1946 Golden Anniversary convention of the AFA

THE 1946 convention of the American Foundrymen's Association—the organization's Golden Jubilee—is planned to be held in Cleveland next May 6-10, according to an announcement by William W. Maloney, secretary. Marking a resumption of the annual conventions, which were interrupted this year by wartime travel regulations, the 1946 affair is to include a Foundry Show to be held in Cleveland Public Auditorium, and a Foundry Congress of technical papers.

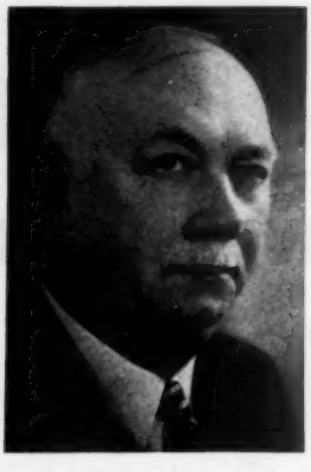
Next year will mark the 50th anniversary since the first AFA convention, held in Philadelphia in 1896, and except for 1921 and 1945 the annual gatherings have proceeded without interruption for half a century. Cleveland has been the site of the national meeting on six other occasions—1942, 1938, 1930, 1923, 1916 and 1906. The 1946 convention is expected to be a timely one in presenting the numerous wartime developments in practice, equipment and supplies.

The AFA is planning to make the 1946 event international in scope, with foundrymen from England, France, Belgium, Russia, Mexico, South America, South Africa, Australia, China and other countries invited to attend. The first International Foundry Congress to which the AFA played host was held in Detroit in 1926; the second was in Philadelphia in 1934, and although the third was scheduled for 1942 in Cleveland, international aspects of the latter convention were canceled because of the war.

The Northeastern Ohio Chapter, which invited the AFA to Cleveland for 1946, is one of the association's oldest and largest chapters and will be playing the convention role for the third time. Officers of the group, which has started preliminary plans for the congress, are: President, A. C. Denison, Fulton Foundry & Machine Co.; vice president, Henry J. Trenkamp, Ohio Foundry Co.; secretary, Gilbert J. Nock, Nock Fire Brick Co.; treasurer, F. Ray Fleig, Smith Facing & Supply Co.

Officers of Northeastern Ohio Chapter, Convention Host for 1946

A. C. DENISON



HENRY J. TRENKAMP

GILBERT J. NOCK

F. RAY FLEIG

Repetition builds Reputation

It's the repeat orders that prove the worth of a product and build a reputation of high standard. CROWN HILL SEACOAL FACING enjoys such a reputation because of three prime factors in its quality and its action.

1. VENTS THE MOLD PERFECTLY It is made from carefully selected, high-volatile quick flash coal.

2. ELIMINATES HARD SPOTS IN CASTINGS . . . Due to its extremely low sulphur content.

3. CASTINGS PEEL EASILY . . . The fusion point of the little ash residue left is 2980 degrees F. Molten iron can't fuse it. Castings peel easily, resulting in low cost and time saving in your cleaning room. Try CROWN HILL SEACOAL FACING and become another of the many repeaters among discriminating foundrymen.

CROWN HILL

SEACOAL FACING

CROWN HILL MEANS QUALITY SEACOAL

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • Mines UPTON, WYO.

IN TWIN CITIES: The Foundry Supply Co., Inc., 2295 University Ave., St. Paul 4, Minn. IN SOUTHWEST: Beaumont Cement Sales Co., Houston & Beaumont, Texas, and Harvey, La.

COLEMAN

--for every fo

Coleman Rolling Drawer Core Ovens for speedy baking of small and medium cores.

Coleman Transrack Core Ovens for operation with portable racks. Single or multiple rack capacity.

Coleman Horizontal Conveyor Core Ovens for large scale specialized production.

Coleman Car Type Ovens for baking big cores or drying molds. No job too large.

Coleman Conveyor Mold Ovens for high speed continuous drying of molds.

COLEMAN
CORE AND MOLD
OVENS

The FOUNDR
BUILDE

CORE AND MOLD OVENS

foundry requirement

Coleman Ovens are built in all types and sizes to best meet each and every operating requirement.

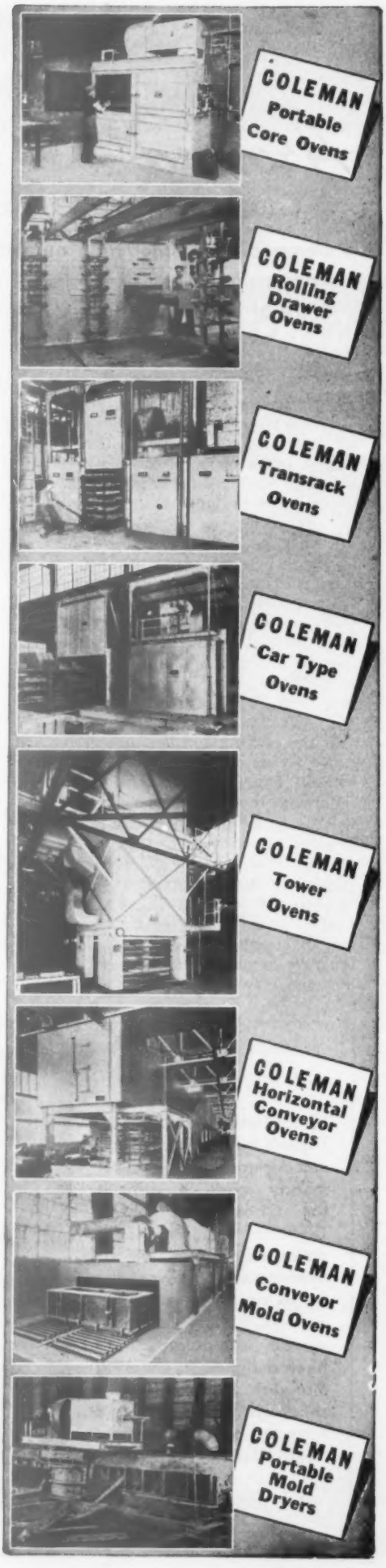
An investigation of Coleman Core and Mold Ovens to meet your own needs may disclose outstanding cost-cutting possibilities.

Over 8,000 successful installations in all types of casting production and the experience gained in over 40 years of specialization are back of every Coleman Core and Mold Oven.

Perfect baking is guaranteed with all fuels. Coleman Ovens may be operated with any "automatic" fuel such as gas, oil, electricity or stoker coal, whichever is most economical to obtain in your district.

We will survey your requirements and offer recommendations without any obligation on your part.

Write for Folio of Bulletins.



QUIPMENT *Company*

COLEMAN AND SWARTWOUT OVENS

LEVELAND 13, OHIO, U. S. A.

Around DETROIT

BY A. H. ALLEN
Detroit Editor, The Foundry

Demand from other than automotive consumers boosting gray iron casting requirements to unprecedented level. . . . Possibility of steel foundries turning to gray iron work seen

REQUIREMENTS for gray iron castings, outside the purely automotive mass produced types, are mounting to unprecedented levels, as production plans for a wide range of industrial equipment and peacetime consumer goods are gradually being unfolded. It is still too early for much of this business to be released, but certain foundry operators are being tipped off to expect specific tonnages from various customers and to hold themselves in readiness for releases. One rough estimate, not backed by any extensive amount of detailed analysis, however, is that there may be 500,000 tons of new gray iron business in the offing around Detroit.

If this is true, and if current forecasts prove accurate, a shortage in productive capacity looks almost certain. Expanded requirements of the automotive industry will be fairly well taken care of by extensions to captive foundries ($3 million at the Pontiac foundry, for example) which are now in process. They will handle the cylinder blocks, cylinder heads, pistons, flywheels, transmission and differential housings needed in passenger cars at present projected schedules and may even be hard put to keep up with castings demand should production move up to an annual level of 6,000,000 cars, which many are talking. On top of this, though, is a record level of civilian truck production which must be accommodated, and that is already a reality.

In addition, there looms a vastly accelerated market for smaller gray iron castings of the type used in household goods like refrigerators and washing machines, plus large numbers of special types of industrial machinery, plus agricultural implement needs which are slated to be bursting their seams shortly. To these add greatly amplified requirements for tools, dies, jigs and fixtures which are even now taking shape on drawing boards for the 1947 model automotive program, and you have what appears a real gray iron boom.

Whether the answer to the supply problem is the construction of new foundries, or perhaps the conversion of some steel foundries to gray iron remains to be seen. The second alternative interests many, for the reason that the outlook for steel castings in this area is dark. Ordnance needs are a thing of the past, leaving railroad business as the most likely output. High labor rates and unsettled labor conditions in this area make competition difficult with steel foundries outside of Michigan, a fact which operators are suddenly running up against once more after 3½ years of more or less forgetting about competitive costs on government work. It is possible to melt gray iron in electric furnaces and meet the price of cupola iron, in the opinion of some foundry engineers, so perhaps in the months ahead steel foundries faced with shrunken backlogs may give serious thought to moving in on the gray iron market.

One of the larger independent foundries in Detroit reports that despite extensive war contract cancellations, September tonnage was off only 14 per cent from the level prevailing throughout most of the war. This is felt to be a distinctly encouraging sign and, furthermore, reservations have been placed for tonnage which will push output beyond the war level, although releases on the latter are some weeks away.

Veterans Are in No Hurry

This producer is not hiring additional men at present, preferring to mark time until more returned war veterans have had a chance to don civilian clothes and seek jobs. When this will be is anyone's guess, since the average veteran so far is showing little inclination to rush back into industry, preferring to take a rest, spend his time mustering out allowance and take the acclimation to civilian life by easy stages.

V-J Day brought a general relaxation of effort and enthusiasm among most all working people. Immediate layoffs in all Detroit plants were estimated variously at 150,000-200,000, and although re-employment has started on a small scale, many of those laid off are taking it easy for the present, romping off to vacations at summer resorts and using their unemployment compensation allowances, when they arrive, to finance the fun.

This trend has not been so noticeable in foundries, particularly the independent operators who have been able to keep operations going; yet even there the disappearance of overtime work has meant reduced take home pay and has brought about some grumbling among working forces along with hints that a 30 per cent increase in basic wage rates would be welcome. Unions in the large automotive plants have incorporated the 30 per cent wage increase in new contract demands and shortly will be fighting them out with management.

(*Concluded on page* 138)

PEACETIME PATTERNS: A sniper's bullet which felled him during fighting in Normandy made it difficult for Chester Zyhowski, Trafford, Pa., to hold down his former job as machine molder. Now the 25-year-old veteran of the African, Sicilian and Normandy campaigns has been assigned to checking material in the pattern shop of the Trafford Foundry of the Westinghouse Electric Corp.

Mathews

ROLLER CONVEYERS

Engineered to serve Production

Roller Conveyer for foundry application should be designed to withstand severe service. The rollers must be rugged and free-running, and the bearings should be protected from grit and dirt. If the conveyers are located in a pouring zone, shotguards should be used on the ends of the rollers. Mathews Engineers have devoted much time and effort toward developing an outstanding Roller Conveyer design for foundry application. There is a Mathews Engineer operating in your vicinity. Ask him about Roller Conveyer and the many other types of Mathews Conveyers which have been engineered for foundry service. He will show you why Mathews Conveyers are able to stand up under the most severe foundry applications. Write or wire today.

Mathews Conveyer Company

ELLWOOD CITY, PENNSYLVANIA

(*Concluded from page 136*)

Studebaker, incidentally, dropped a bombshell in the situation by announcing a boost of 12 cents an hour for all employees and a promise to match any increases beyond this amount which may be made by Detroit car builders. The latter, for the moment, are saying nothing but are casting annoyed looks in the direction of South Bend.

Strike of 2000 Michigan patternmakers, in its fifth week at this time of writing, has stymied a large amount of pattern work and resulted in the virtual closing of companies like City Pattern Foundry & Machine Co. and Commerce Pattern. Striking AFL patternmakers finally induced foundry and machine shop help in these plants to walk out after the latter had remained on the job for a couple of weeks following the patternmakers' stroll. Increase of 35 cents an hour is being sought by the pattern boys, but it was denied by the WLB and the men were ordered to return to work. They ignored the order and both managements and labor appeared standing pat while new pattern jobs rested on the shelves.

If strikes are to be held, now is a good time from the standpoint of management and a bad one from the standpoint of labor, since during the reconversion period and in the face of delays in shipments of new materials a strike does not do too much harm. If walkouts and interruptions by labor are to be scheduled, say, two months from now, then the whole automotive picture will be decidedly unattractive. Many executives think just this is in store, but are resigned to the fact sooner or later labor is going to have to come to reasonable terms.

Several of the automotive die foundries will be too busy this month on the first castings for 1947 model dies. The 1946 model production actually is regarded as an interim affair, patterned closely after what was produced in the final weeks of the 1942 model, so the new program should be a fairly large one, assuming the introduction of numerous changes in the 1947 models. In addition, there will be some new models, including a new light-weight economy model Ford, a Chevrolet in the same category and, in the face of such competition, possibly a Plymouth counterpart. In addition, some passenger car builders are reported eyeing the light truck field with relish, figuring it a simple matter to drop a light truck or commercial car body on a passenger car chassis and create a new entry in the truck market. Nash for one is said to have plans in this direction.

Ford Plans Innovation

Ford is planning to release some Meehanite dies for front fenders which appears something of an innovation in this type of die which is usually of a standard gray iron.

A new automatic transmission has been developed by Ford engineers, working in co-operation with Borg-Warner, and it will be machined and assembled by the Detroit Gear Division of the latter company. Castings for housings are already in production at a reported rate of 200 per day, although this figure seems high for a start. It is not known on what lines the transmission will be available, possibly only Lincoln and Mercury, but it is said to resemble the General Motors Hydraulic transmission developed for Olds and Cadillac, although somewhat simpler in design with fewer parts.

Seeking to overcome the deficiencies of sea coal as an ingredient of molding and core sand mixtures, a local chemist and engineer has proposed chemical treatment of sand to produce a uniform coating of carbon on each grain of sand. Preliminary tests have shown considerable promise for the method which is, to say the least, a radical departure in foundry practice. Further research is being carried out on a production basis to determine results in terms of improved finishes on castings, cost, and lessening of dirt and dust in pouring operations.

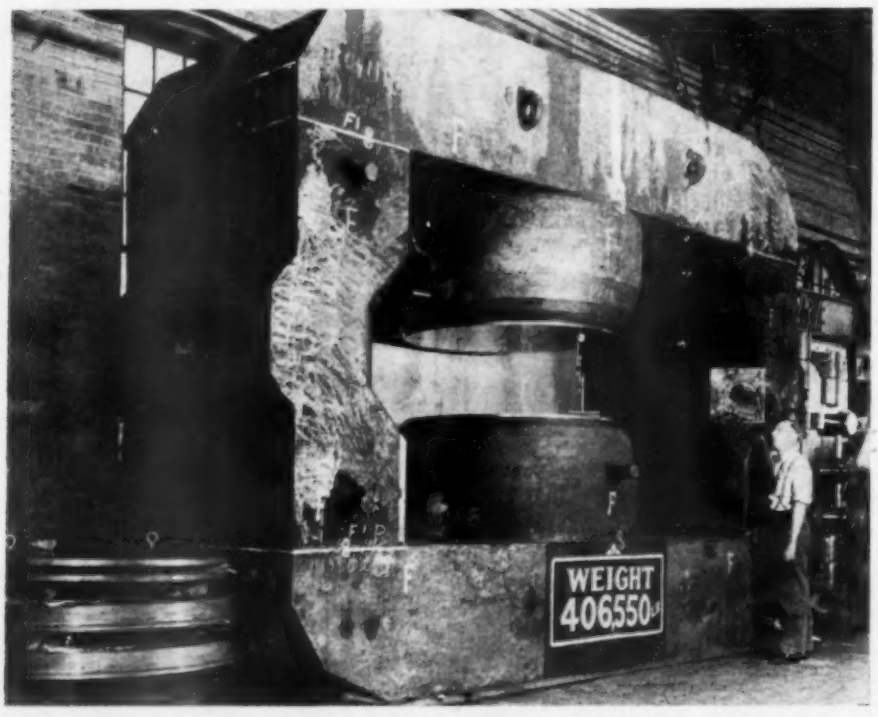
Cyclotron Magnet Requires

LARGE STEEL CASTINGS

STEEL castings comprise the major portion of the huge magnet that is a necessary part of the "atom-smashing" cyclotron, the basic tool in research that later led to the atomic bomb. The first cyclotron owed its existence to the availability of a large magnet built originally for making radio waves by a method which was soon discarded. This magnet, built in 1930, had two facing poles consisting of flat circular plates 27½ in. in diameter. Since then, many large magnets have been made for use in cyclotrons.

The magnet illustrated here, built for the Carnegie Institute, Washington, weighs more than 200 tons and was cast in six pieces—the four members of the hollow square and the two heavy pole discs with their supports. American Rolling Mill Co., Middletown, O., produced the castings, the principal problem in this operation being the attainment of a sound structure in pieces of somewhat larger than average size. All of the castings were x-rayed for fractures or other flaws which, if found, would have necessitated the making of new parts, since no defects can be tolerated in the core.

Machining of the rough castings was done by the Mosler Safe Co., Hamilton, O. This is a relatively delicate process in that the two 42-in. diameter poles require a high degree of accuracy in smoothness of their faces and distance apart. Fifteen men worked for five months on the machining and finishing of the pieces. The castings then were assembled with 6-in. diameter bolts and after a final inspection were disassembled and shipped to Washington. There the castings were reassembled and the remainder of the cyclotron built around the magnet core.



Checking pole faces of cast steel magnet for Carnegie Institute cyclotron

Sly Dust Filter mounted over Sly Blast Room

SLY DUST CONTROL

Removes THE *DUST* HAZARD—WIDELY USED, *NOT* EXPENSIVE

THE Sly Dust Filter (shown at left) handles the dust created by a Sly Blast Room, grinder booths, and surface grinders.

It does a thorough filtering job—actually *filtering* the dust out of the air by passing it through a series of cloth bags ingeniously arranged in a compact space within the filter case. The cleaned air contains no visible dust.

Sly Dust Filters comply fully with the requirements of the laws and regulations of the various states. They help provide better working conditions—increase production. Thousands of successful installations. Sly Dust Control is *not* expensive.

Send for Bulletin 98 and tell us about your problem so that we can write you fully.

THE W. W. SLY MANUFACTURING CO.
4753 TRAIN AVENUE — CLEVELAND 2, OHIO

SLY INDUSTRIAL DUST CONTROL

TUMBLING MILLS • BLAST CLEANING EQUIPMENT

CERTIFIED GOLDEN CORE OILS, identified by their color, are made from the most select raw materials. Usually termed "conventional core oils."

CERTIFIED UNIQUE CORE OILS give the same results as our Golden Core Oils, but are made from off-colored materials which are dark in color and also cost much less.

CERTIFIED *RAPIDRY* CORE OILS are also dark and considerably lower in price. They bake quicker in the oven or at lower temperature and provide better, more readily collapsible cores.

One of These Core Oils Is Ideal for Your Cores . . . .

We are called upon to supply core oil for foundries large and small, jobbing and production, ferrous and nonferrous, and employing every type of sand and baking conditions. For every requirement we can and do, furnish the ideal grade of Certified Core Oil to produce maximum efficiency at lowest possible cost.

The three types of Certified Core Oil mentioned above are made in several grades of binding strength; the highest being exactly equivalent to that of raw linseed oil, and the lowest being the grade used for core sprays to provide added surface toughness. Among these grades—all of which have been proved in actual service—*there is an ideal core oil for your work.*

Tell us the grade and number of the core oil you use, its color, your type and mesh of sand, and your oven conditions —*we'll send samples!*

CERTIFIED CORE OIL & MFG. CO.

"The House of Dependability"

3308-26 South Cicero Avenue, Cicero, Illinois

Stock and representatives: Buffalo, N. Y.; Elmira, N. Y.; Worcester, Mass.; Bloomfield, N. J.; Reading, Pa.; Sunbury, Ohio; St. Louis, Mo.; Milwaukee, Wisc.; Minneapolis, Minn.; Birmingham, Ala.; Houston, Tex.; Denver, Colo.; San Francisco, Calif.; Portland, Ore.

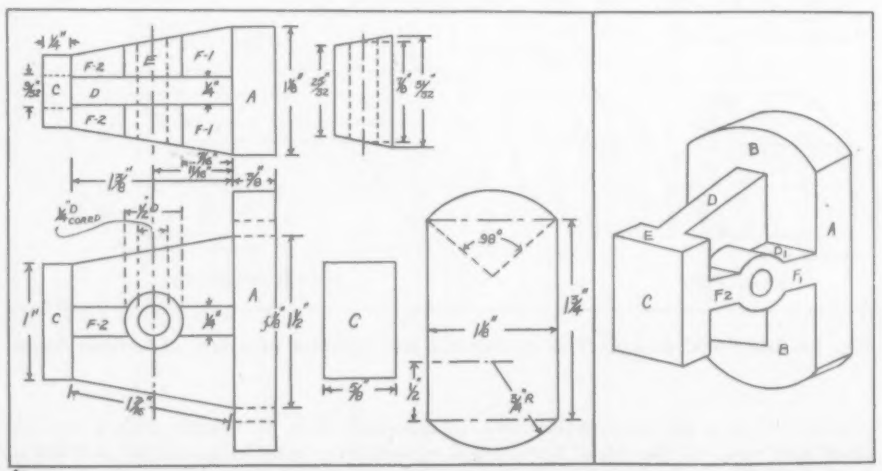
DETERMINING WEIGHTS OF CASTINGS FROM BLUE PRINT DATA

System is the first requisite for estimating the weights of castings from the blue print. The many computations must be carried out as accurately as possible and with a minimum of time and effort.

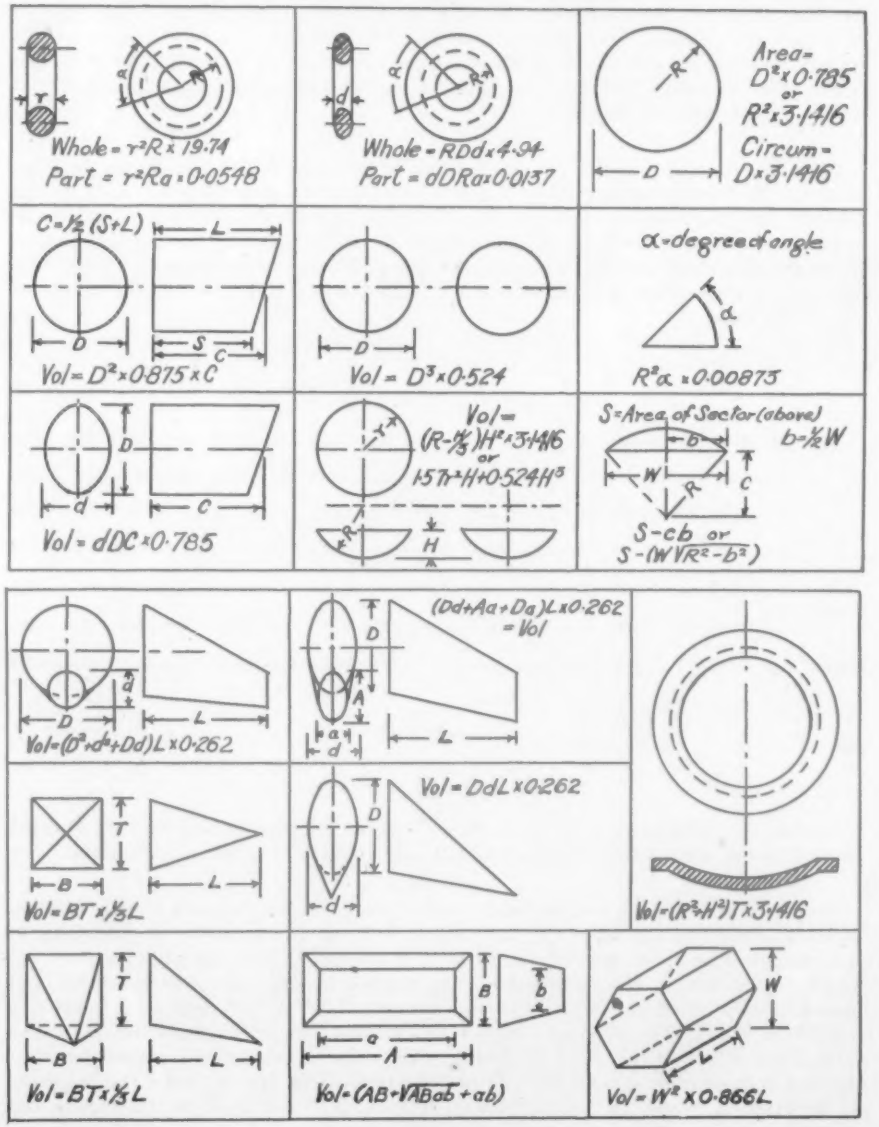
Analysis of the figuring of the small and comparatively simple casting shown in Figs. 1 and 2 indicates something like 50 separate computations and some three dozen conversions from fractions to decimals. This casting is not shown with the idea of demonstrating the solution of a difficult weight estimating job, but simply to illustrate the manner of attacking the problem.

Of course, all the dimensions shown would not appear on the blue print. On occasion the weight estimator is forced to scale the drawing. However, he should do this only after scanning the list of changes—if any—made on the print. Then he can make allowance for parts thrown out of scale and also for shrinkage entailed in the blueprinting process.

In some instances the only tool required is a pencil, but in the great majority of instances the following tools greatly facilitate the work: A triangle for drawing lines



Figs. 1 and 2 (Above)—Dimensional information is presented in the blue print at the left while the isometric sketch at the right indicates the appearance of the casting. Figs. 3 and 4 (Right)—Some of the formulas which may be used to determine the volumes of various shaped solids


Whole = r²R x 19.74
Part = r²Ra x 0.0548
Whole = RDd x 4.94
Part = dDRa x 0.0137
Area = D² x 0.785 or R² x 3.1416
Circum = D x 3.1416
C = ½ (S+L)
Vol = D² x 0.875 x C
Vol = D³ x 0.524
α = degree of angle
R²α x 0.00873
Vol = dDC x 0.785
Vol = (R-⅓)H² x 3.1416 or 1.57R x H² + 0.524H³
S = Area of Sector (above)
b = ½W
S = cb or S = (W√R² - b²)
Vol = (D³ + d³ + Dd) L x 0.262
(Dd + Aa + Da) L x 0.262 = Vol
Vol = DdL x 0.262
Vol = BT x ⅓L
Vol = (R² + H²) T x 3.1416
Vol = BT x ⅓L
Vol = (AB + √ABab + ab)
Vol = W² x 0.866L

DETERMINING WEIGHTS OF CASTINGS FROM BLUE PRINT DATA

between views to help clarify the drawing, etc; a protractor for determining degrees of angles not given on the print; a slide rule. This last item is most important for speedy and accurate work. Multiplication can be made in a fraction of the time required by any other method. The cost of these tools is merely nominal and skill in their use pays large dividends.

Formulas for figuring the cubical content of various shapes are shown in Figs. 3, 4 and 5. Simple application of a few of the formulas taken from Fig. 2, are as follows. For identification and reference the various parts of the casting under discussion have been lettered: A, B, C, D, D_1, E, F_1 and F_2. Briefly the casting may be described as a small pedestal in which the cap and base are connected by two webs intersecting each other at right angles and with a cored boss forming the center of one of the webs.

DECIMAL EQUIVALENTS

64ths	1—.0156	3—.0469	5—.0781	7—.1094	9—.1406	11—.1719	13—.2031	15—.2344							
	17—.2656	19—.2969	21—.3281	23—.3594	25—.3906	27—.4219	29—.4531	31—.4844							
	33—.5156	35—.5469	37—.5781	39—.6094	41—.6406	43—.6719	45—.7031	47—.7344							
	49—.7656	51—.7969	53—.8281	55—.8594	57—.8906	59—.9219	61—.9531	63—.9844							
32nds	1—.0313	3—.0938	5—.1563	7—.2188	9—.2813	11—.3438	13—.4063	15—.4688							
	17—.5313	19—.5938	21—.6563	23—.7188	25—.7813	27—.8438	29—.9063	31—.9688							
16ths	1—.0625	3—.1875	5—.3125	7—.4375	9—.5625	11—.6875	13—.8125	15—.9375							
8ths	1—.125	3—.375	5—.625	7—.875											
4ths	1—.25	2—.50	3—.75												

Section *A* is a block or slab 1⅛ x 1¾ x ⅞-inches (¾ plus ⅛-inch finish). Cubical content of this section therefore is: 1.75 x 1.125 x 0.4375 = 0.862 cubic inches.

Section *B* includes the two segments at the ends of *A*. The formula for the solution of such shapes, not including the thickness is S-cb. as shown in Fig. 3: According to a formula in Fig. 2, the area of the sector is R^2 a x 0.00873. In this instance R = ¾" and a = 98 degrees, then by doubling the degrees to take care of both sectors, and including also the thickness, the formula becomes 0.75^2 x 196 degrees x 0.00873 x 0.4375 = 0.422. The product of cb x the thickness must be deducted from this total. Since b = half the width of section *A*, by webs or connecting members between the two ends, may be figured according to the formula (A plus B) ½H x the thickness as indicated in Fig. 4. In this instance A = 1 in., B = 1½ in. H = 1⅜ in. and the thickness is ¼-in. Therefore the cubical content will be secured by substituting in the formula, as follows: (1.00 + 1.50 x 0.50 x 1.375 x 0.25 = 0.430 cu. in.

Section *B*, is included in the contents of Section *E*, therefore it must be deducted from section *D*. The cubical content of a cylinder ½-in. in diameter and ⅝-in. in length is as follows: 0.50^2 x 0.785 x 0.2813 = 0.055 cu in.

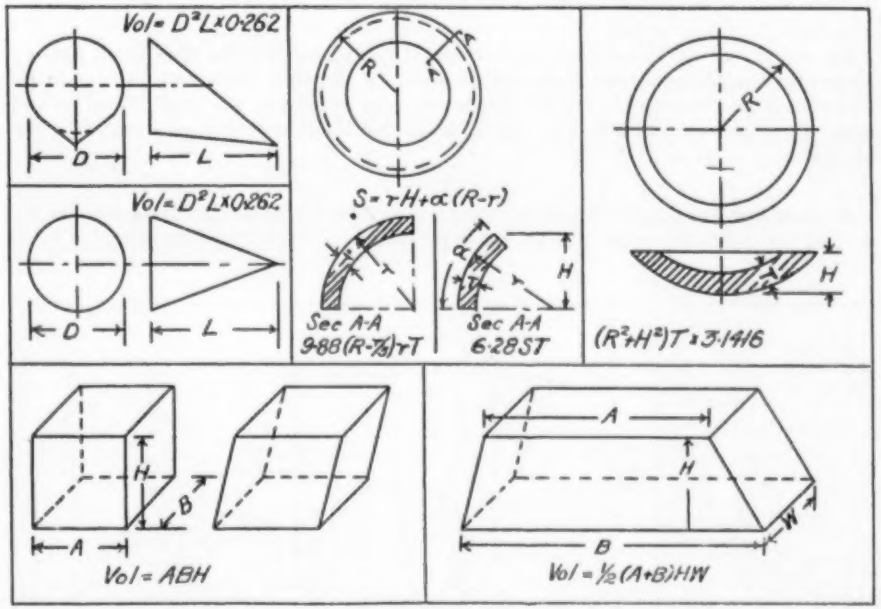


Fig. 5—Additional formulas for calculating the volumes of solids of various forms

Section *E* is a hollow cylinder ½-in. in diameter, ⅝-in. in length with a central cored hole ¼-in. in diameter. The cubical content of a cylinder equals D^2 x 0.785 x the length. The process in the present instance may be shortened by deducting the square of the inside from the square of the outside diameter. The difference between 0.50^2 and 0.25^2 = 0.1875. Therefore, the content of *E* is 0.1875 x 0.785 x 0.875 = 0.129 cu in.

(To Be Concluded)

CARBON HAS NO MELTING POINT!

CARBON, in all forms, volatilizes without melting at temperatures far above those encountered in commercial operations.

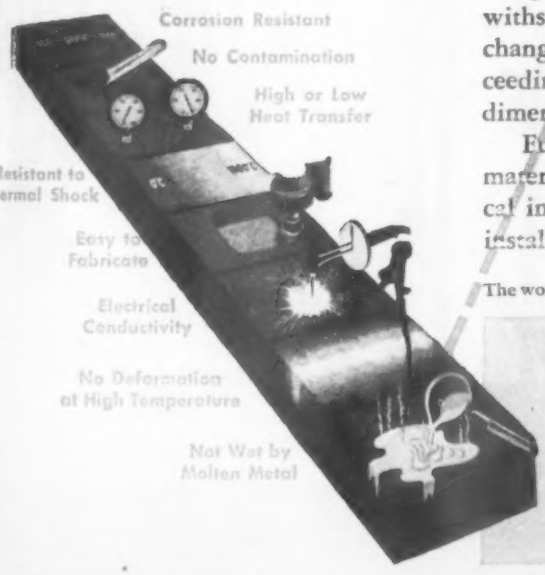
The use of large carbon blocks for blast furnace linings is an excellent example of carbon's extraordinary ability to retain its shape—*and strength under pressure*—at white hot temperatures. In addition, it is highly resistant to chemical attack by the most corrosive slags. Hence it has become the preferred material for many high temperature applications in the metallurgical and electrochemical fields.

Graphite's very low coefficient of thermal expansion—.0000015 per °F—explains why some graphite molds for ferrous and non-ferrous metals withstand several thousand pours without longitudinal or cross-sectional change. Graphite electronic tube components, at temperatures far exceeding operational requirements, maintain an unmatched degree of dimensional stability.

Furthermore, "National" Carbon and Graphite are available as porous materials or in the form of "Karbate" impervious products for the chemical industries. We invite your inquiries on the many applications and installations of these highly versatile materials of construction.

BAR OF WHAT?

Carbon, Graphite or
"Karbate" materials, of course!



The words "National" and "Karbate" are registered trade-marks of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.

Unit of Union Carbide and Carbon Corporation

UCC

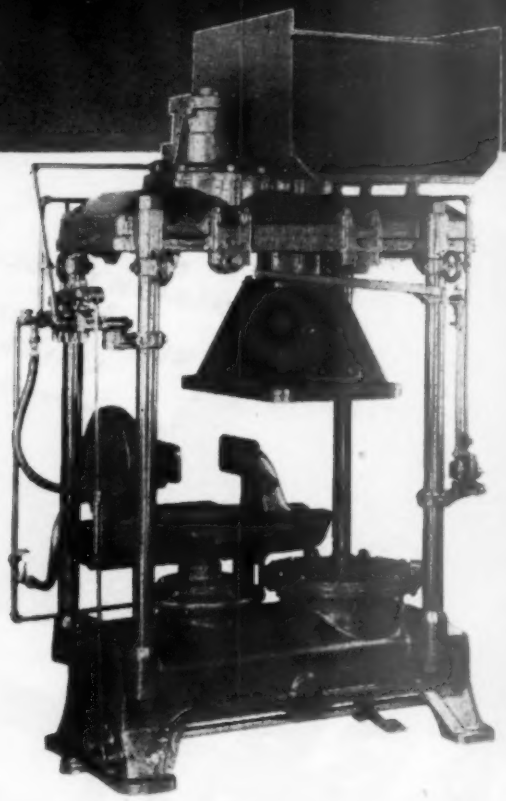
General Offices: 30 East 42nd Street, New York 17, N. Y.

Division Sales Offices: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco

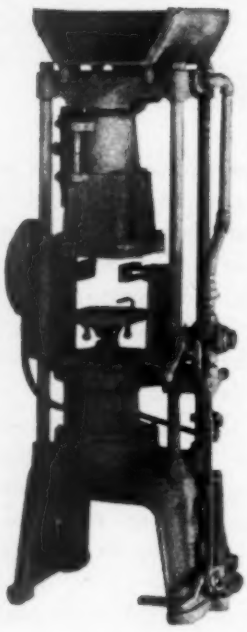
INTERNATIONAL
Sand Blowers

are designed for Speed in Operation, Ease of Handling, and for the making of BETTER CORES.

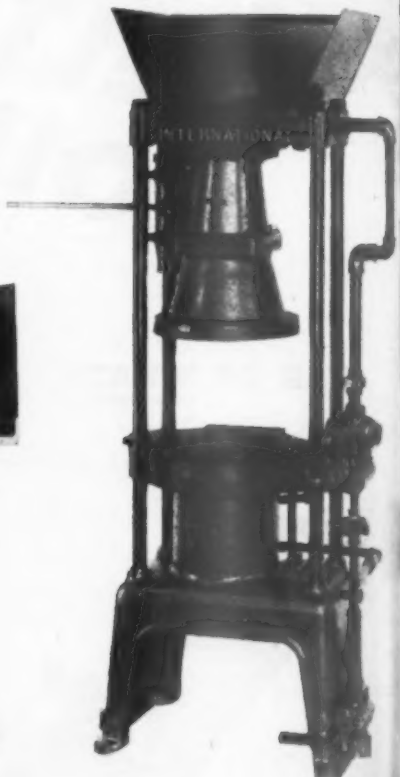
There is an INTERNATIONAL Sand Blower to fit your every need. A call will bring an INTERNATIONAL Service Man with wide foundry experience to help you solve your core making problems.



Type SB12—Adapted for large split boxes.

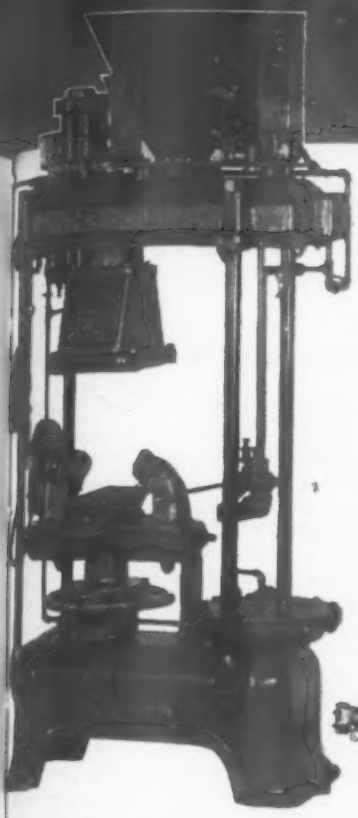


Type SB5 Sand Blower, adapted especially for small vertically split boxes.

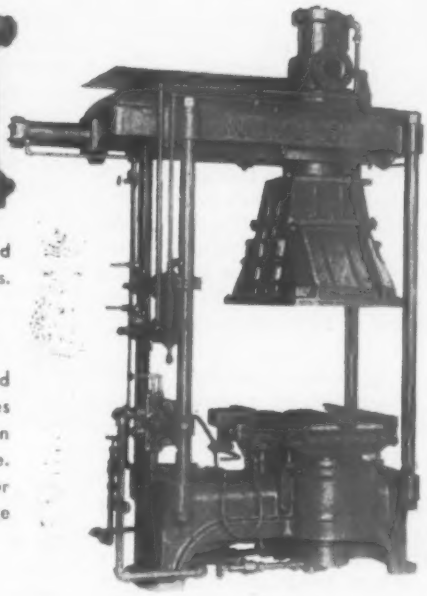


Type SB7 Sand Blower, adapted especially for small horizontally split boxes.

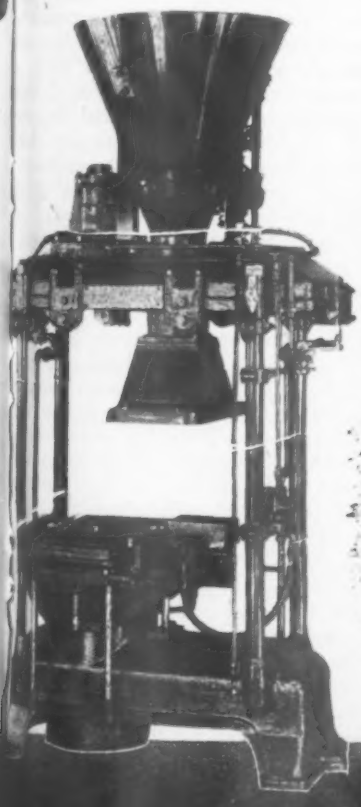
Type SB11—For medium sized cores with air clamp and draw feature.



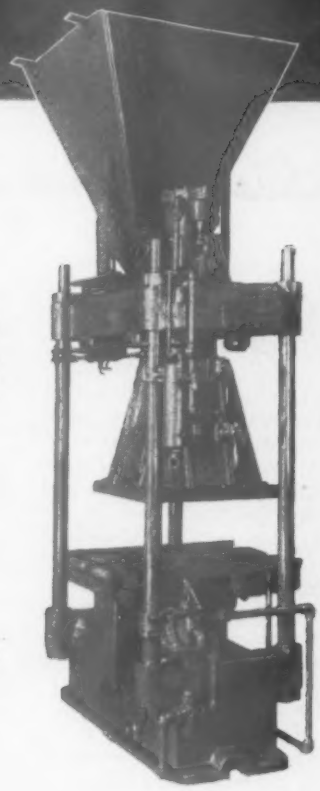
Type **SB10**—Sand Blower, adapted especially for medium size split boxes.



Type **SB13**—Sand Blower adapted especially for horizontally split boxes of medium size, but larger than can be handled by the **SB11** machine. May be had with the roll-out conveyor feature for ease in handling large core boxes.



Type SB15-H is adapted for the making of extra large Cores. Hydraulic clamp and draw feature.



Type SB17-H Sand Blower is the right machine for blowing those Super-Cores weighing up to 350 lbs.

INTERNATIONAL

Sand Blowers and Molding Machines

are busy in plants in every section of the country, helping in the giant job of re-conversion to peacetime manufacture of civilian requirements. INTERNATIONAL engineering ability is at your service whenever you need it. Ask to have our Engineer call and talk over your problems.

INTERNATIONAL MOLDING MACHINE COMPANY

2608-2624 West Sixteenth Street ★ Chicago 8, Illinois

Activities of foundry GROUPS

Cincinnati

OPENING meeting of the Cincinnati District Chapter, AFA, for the 1945-46 season was held Sept. 10 at the headquarters of the Engineering Society, Cincinnati. Approximately 75 members and guests assembled for dinner and for the regular chapter meeting which followed. The new chapter chairman, Al W Schneble, presided.

The meeting was highlighted by a comprehensive discussion of cupola operation. The main feature of this discussion was the scheduled talk by B. P. Mulcahy, Citizens Gas & Coke Utility, Indianapolis. Mr. Mulcahy chose as his subject "Coke," and devoted a considerable portion of his time to an exposition of the chemistry and mechanics of coke combustion in the foundry cupola. He also traced the evolution of coke from its original form to the final product and mentioned the many factors affecting its final characteristics.

The consideration of cupola operation was further augmented by an unscheduled but nevertheless welcome presentation of a film on "Cupola Charging," prepared by the Whiting Corp., Harvey Ill.

During the course of the meeting Chairman Schneble announced the appointment of two additional committees to serve during the coming year. Members of the educational committee named were Joseph Schumacher, Hiram Brown and William H. Hoppenjans Jr. Members of the plant visitation committee are Herman K. Ewig, Ed King and H. F. McFarlin. The Oct. 8 meeting of the chapter at the headquarters of the Engineering Society will be addressed by Charles K. Donoho, American Cast Iron Pipe Co., Birmingham. Mr. Donoho will speak on "Cast Ferrous Metals."—*William H. Hoppenjans Jr., secretary.*

Chicago

POPULARITY of the annual stag outing of the Chicago Chapter, AFA, continues to mount, for the 1945 event on Aug. 18 hit a new all-time record with an attendance of 1107. The place, as usual, was the Lincolnshire Country Club. A typical hot summer day with a temperature in the upper 80's was propitious for golf and the entertainment program.

Golf ran throughout the day. A new feature—a bait casting contest and exhibition—was staged in midafternoon, and was followed by a horseshoe tournament.

A sumptuous dinner was served in the Big Tent adjacent to the clubhouse at 7 p.m., after which sports prizes and door prizes were awarded in generous number. The evening was topped off with several acts of floor show which the committee designated as, and the guests agreed was, "A Spectacle du Plancher replete with Pagliacci, puns and pulchritude."

The outing committee responsible for the event was headed by Edward J. Cullinan, Western Foundry Co., as chairman, and Harry E. Cullen, South Works, Carnegie-Illinois Steel Corp., as secretary. In appreciation of his services in the latter capacity for a number of years, the chapter presented Mr. Cullen with a handsome gold watch.—*Erle F. Ross.*

GOLF PARTY COMMITTEE: Members of the committee in charge of the successful annual golf and stag party held July 20 by the Wisconsin Chapter, AFA. (Photos on this and succeeding pages courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee)

Southern California

ABOUT 500 members and guests attended the eighth annual outing of the Southern California Chapter of the AFA, Aug. 4, at Lakewood Country Club, Long Beach, Calif. Entertainment included golf, softball, horseshoe pitching and track events. Music by talented amateurs put the finishing touches to an enjoyable afternoon under the summer sun. Congratulations on a most successful day were received by President Robert Haley, Vice President William D. Emmett, Secretary Hal Russill, and Treasurer Leonard O. Hofstetter, who were ably assisted by members of the entertainment committee, with Earl Shomaker, as chairman. Roy Barner was golf chairman for the day and Bud Jenkins carried off most of the events' top honors. A banquet in the evening was followed by a rousing stag show which lasted until nearly midnight. —*James B. Morey, publicity chairman.*

Canton

SATURDAY, Aug. 18, was celebrated as the second annual summer outing of the Canton District Chapter, AFA, when approximately 100 members and guests from foundries within a radius of 40 miles foregathered on the spacious and hospitable grounds of Otis D. Clay, a few miles south of Canal Fulton, O. Otis is treasurer of the chapter and also the owner of the little cast iron negro boy horse holders described with admiration and a certain amount of technical detail in the July issue of THE FOUNDRY.

From 3 to 6:30 p.m. the strenuous and streamlined members of the group kept themselves in condition by indulging in the most violent forms of athletic exercise, pitching horseshoes from one point to another, and striking and chasing a ball all over you-know-where and 40 acres. All danger of dehydration and heat prostration was prevented by a Safety First committee which had established a booth or oasis for the dispensing of salt tablets, etc. The remaining members of the group, men who had not carried a hand ladle of iron for 40 years or more, and others whose figures had spread to an alarming degree fore and aft, strolled through the flowery gardens or sat under the trees where they engaged in mental games of skill and chance learned in the good old days when they waited for the big ladle to fill under the spout. These sticky gam

(*Continued on page* 148)

THEY CALL IT "*Gumption*" UP IN VERMONT

THE down-East Yankee says a man has "gumption" when he does a hard job skillfully . . . and profitably.

Foundry-men depend on MOGUL and KORDEK to produce money-making castings. You get mighty few discards when you use these two reliable binders.

MOGUL is a perfect Green Bond, which increases permeability in cores. Use MOGUL in cores for both green and dry strength.

MOGUL works with core oil; it decreases drying time and yields smooth cores. MOGUL works perfectly with pitch or resin, too, because cores can be handled while still warm. MOGUL is widely used with sharp sands.

Team up with MOGUL and KORDEK — you can depend on them.

KORDEK

KORDEK is a perfect DRY BOND which can be used in smaller quantities than most dry binders. KORDEK produces better castings with fewer discards.

CORN PRODUCTS SALES CO. 17 BATTERY PLACE NEW YORK 4, N. Y.

required practically constant lubrication.

The dinner served in the recreation room and eaten from tables dotted around the lawn proved the fallacy of the old natural rule that a container cannot be filled twice at the same time. The day before the event Otis killed a pig—he has more pigs than you will find in the average foundry yard—and had the body nobly barbecued. After dinner your reporter spoke briefly. Said he was greatly pleased to be present. Why shouldn't he? A professional entertainment group put on a hilarious talking and singing act. The meeting broke up with cheers for Mr. Clay and his able assistant Mrs. Heller, for Mrs. Clay and the ladies who prepared the dinner and for the highly competent and energetic committee who molded and poured the job and turned out such a perfect casting: Robert A. Epps, chairman; D. T. Born; Charles Scoville, Charles Bunting; C. Trump and Otis D. Clay.—*Pat Dwyer*

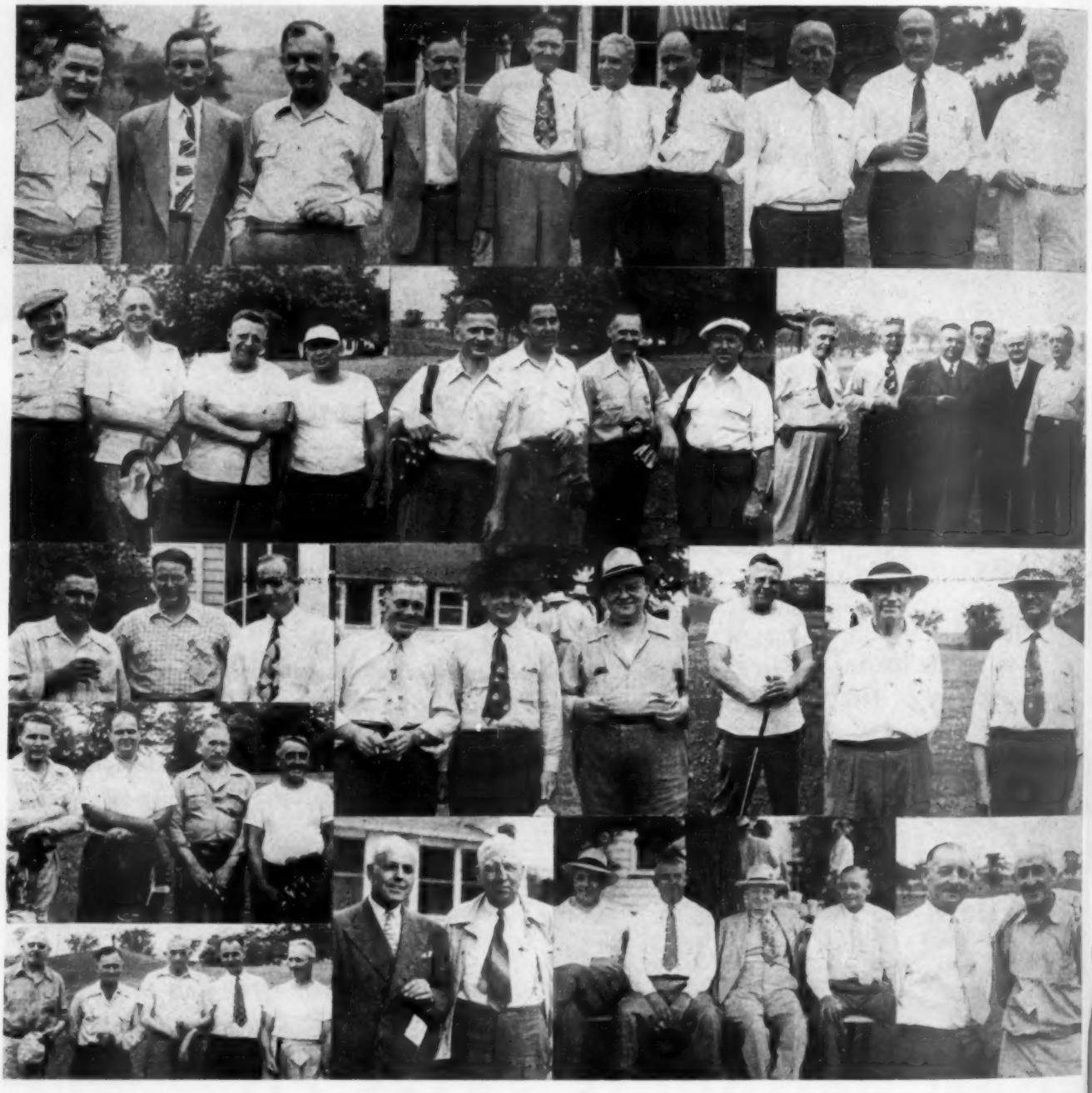
Northeastern Ohio

INTENSE interest in future developments in the foundry field was indicated at the opening meeting of the Northeastern Ohio Chapter, AFA, held on Sept. 13 with an attendance of 175 members and guests, and augurs well for the fall and winter meetings of the organization.

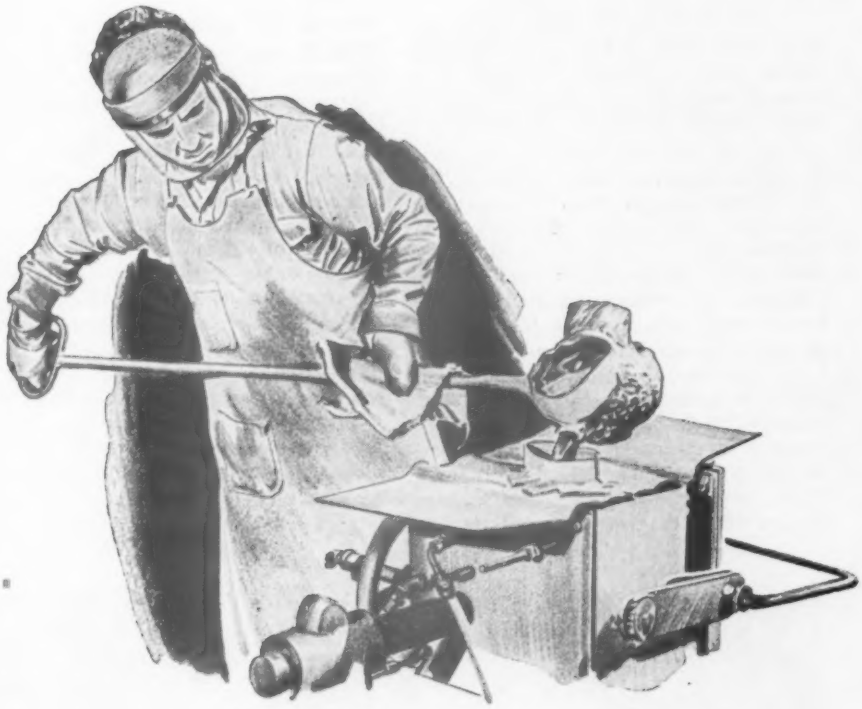
President A. C. Denison, Fulton Foundry & Machine Co., presided, and introduced Fred J. Walls and William W. Maloney, national president and national secretary, respectively, of the AFA, and Harry Reitinger, a national director. Mr. Walls spoke briefly on the aims of the AFA, pointing out that membership now is over 8000, and the budget over a third of a million dollars. While the association has stressed the technical side of the foundry industry two new committees have been formed to deal with management and youth encouragement. Through the latter AFA hopes to bring new blood into the industry. Mr. Maloney called attention to the forthcoming 1946 convention which will be held in Cleveland on May 6 to 10 stating that it was doubly significant since it marked the 50th anniversary of AFA as well as the first in which a real discussion of wartime developments could be held.

Following these talks Fred Walls presented national awards to prize winners in the 1944 apprentice contest representing the Northeastern Ohio Chapter.

(*Continued on page* 150)



Some of the 700 members and guests of the Wisconsin Chapter who attended the group's annual summer golf party



Just as magnesium casting alloys lighten products . . .

so Dow's unmatched technical experience

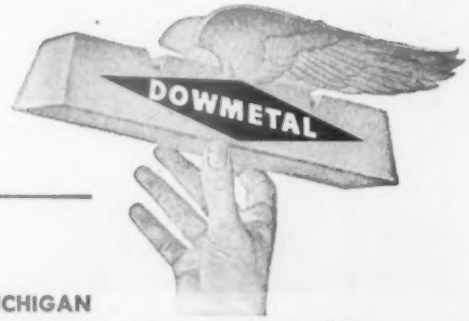
can lighten production costs

When Dowmetal magnesium alloys enter your shop, they bring with them the results of 29 years' experience by the pioneer producer of structural magnesium: complete dependability in supply . . . a full line of fluxes and accessory materials . . . the technical services of an expert staff of metallurgical specialists.

The many Dowmetal magnesium alloys, developed to fit precisely the property requirements of specific applications, are of uniformly high quality. Continuous Dow research has improved corrosion resistance, facilitated production and fabrication and developed efficient shop practice.

Magnesium alloys, in the form of ingots, produce strong, sound, easily machinable castings. In addition, Dow is one of America's leading producers of fabricated magnesium products.

To obtain the manifold advantages of magnesium and the benefits of Dow's complete fabrication facilities, you need only contact the nearest Dow office.



MAGNESIUM

THE METAL OF MOTION

MAGNESIUM DIVISION, THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington • Cleveland • Detroit • St. Louis • Chicago • Houston • San Francisco • Los Angeles • Seattle

(*Continued from page* 148)

They were Steve Grabowski, Cleveland Trade School, second in gray iron molding, and Robert Cech, Cleveland Trade School, second in patternmaking.

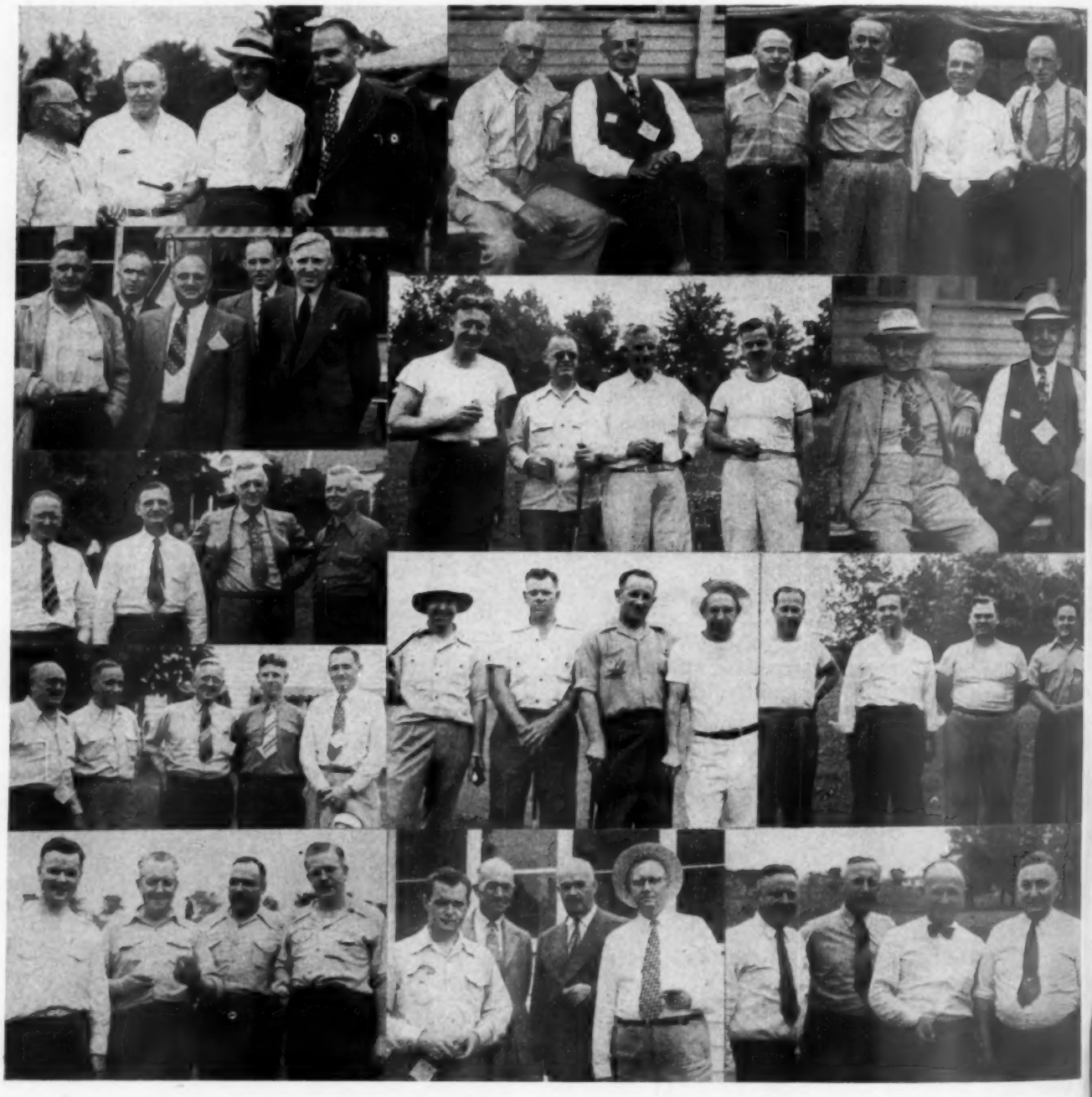
Principal speaker of the evening was Lester B. Knight, Lester B. Knight & Associates, Chicago, who presented an extremely interesting discussion on "Modernization of Foundries". He stated that while modernization and mechanization are synonymous terms to the foundrymen, actually they are not, although it usually takes some degree of mechanization to accomplish a modernization program. Foundry modernization, according to the speaker, includes modern thinking by owners, managers and operators, as well as modern facilities. It includes modern sales engineering methods of marketing the castings, and modern methods of producing these castings.

Mr. Knight listed the steps necessary to accomplish modernization in the following order of importance: Organization, procedures and methods, costs and facilities. Facilities are placed last because they are no better than the men and procedures behind them. The foundry should be organized properly with clear-cut lines of responsibility, and authority commensurate with that responsibility. Organization should be simple with no overlapping or division of responsibility. Since preventive medicine is less costly than curative medicine, it is wise to establish a committee to review all patterns and castings and recommend in detail the method of producing them. Committee may be composed of the superintendent as ex-officio chairman, metallurgist, patternmaker who is a good rigger, a good molding foreman, a man who knows cores and their application, and in some cases the chief inspector.

Foundries should establish methods for and maintain control of the variables effecting production of high quality castings at low cost. They should know costs in various departments so that unit costs may be kept low. Foundry management and labor should get together as soon as possible and work out a mutually satisfactory basis for a full day's wage for a full day's work. Proper pattern and rigging are necessary to hold proper costs in molding, cleaning, finishing and in the machine shop.

Working conditions must be improved so that foundry personnel may travel to and from the job looking as respectable as the machine

(*Concluded on page* 153)



Other participants in the Wisconsin Chapter's golf party at Ozaukee Country Club, Milwaukee, July 20

LEARN ALL THE FACTS...AND YOUR CORE OIL WILL BE PENOLYN!

1. **UNIFORMITY** — rigid laboratory control; no "settling out" in drums or storage tanks.

2. **CONCENTRATED FORM** — high sand to oil ratio; economical.

PITTSBURGH, PA.

Penola
Reg. U.S. Pat. Off.

NEW YORK DETROIT
CHICAGO ST. LOUIS

Our engineers are always ready to serve you. Write us about your particular core oil problem.

3. **NO OBNOXIOUS ODOR** — during mixing, baking or pouring.

4. **NO SEEPAGE** — will not settle or drain to the bottom of sand mix or green, unbaked cores; baked cores will not stick to plate.

5. **NO CRUSTING OF GREEN MIX** — air dries slowly; green mix can be stored as long as 24 hours and still be usable.

6. **CLEAN WORKING** — eliminates frequent cleaning of core boxes; sharp draws.

7. **WIDE TEMPERATURE BAKING RANGE** — small and large cores can be baked at the same time; no burnt cores.

8. **POLYMERIZED FORMULATION** — maximum strength right through to center of baked core; dryer and plate side of equal hardness as exposed surfaces; no adherence.

9. **MINIMUM GAS** — less venting; fewer blows; lower casting losses.

10. **AMPLE COLLAPSIBILITY** — no hardened lumps to dig out; disintegrates while allowing metal to solidify and cool; fewer cracked castings.

No. 8 Mexican Graphite lowers chill depth and Brinell hardness, increases deflection and machinability

Photomicrograph from broken half of 1.25 inch arbitration bar of grey iron not treated with No. 8 Mexican Graphite. Cupola charge was made up of 48% steel, 33% cast scrap, 19% malleable pig iron and 45 lbs. of silicon briquettes. Total charge was 2544 lbs. This iron tested to the following physical properties:

Transverse Strength	2,497 lbs.	Total Chill Depth 41/32 in. (wedge bar)
Deflection	0.23 in.	Clear Chill Depth 26/32 in. (wedge bar)
Brinell Hardness	229	

Photomicrograph from broken half of arbitration bar of same base iron as above but treated with 1 lb. per ton of No. 8 Mexican Graphite. Holding time in ladle following addition of Graphite was less than 8 minutes. Note how the addition of No. 8 has destroyed the dendritic pattern and has given a normal flake pattern. The treated iron tested to the following physical properties:

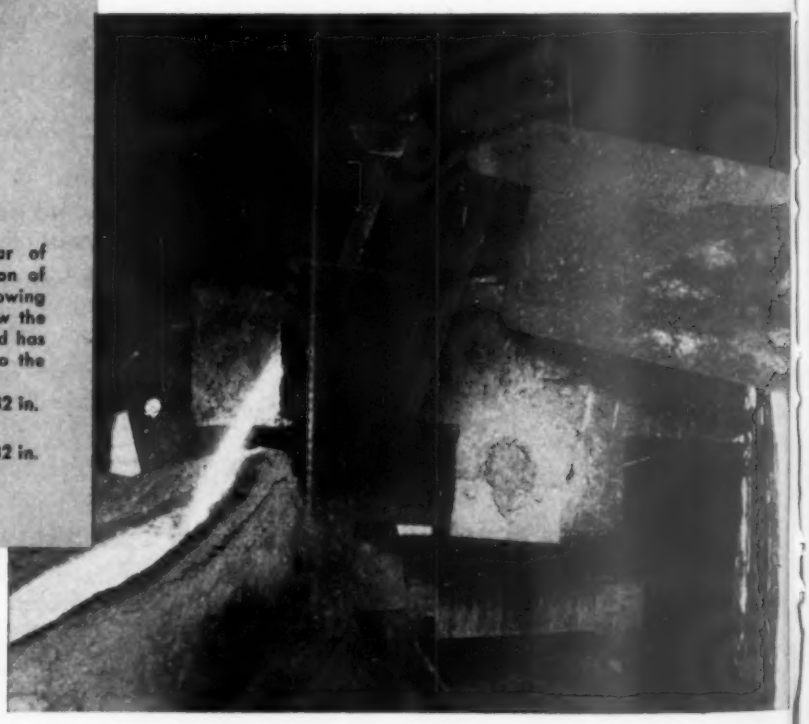
Transverse Strength	2,907 lbs.	Total Chill Depth 13/32 in. (wedge bar)
Deflection	0.31 in.	Clear Chill Depth 10/32 in. (wedge bar)
Brinell Hardness	217	

As is clearly revealed in photomicrographs (see panel), the addition of 1 lb. of No. 8 Mexican Graphite per ton reduced chill depth and Brinell hardness, increased deflection and thereby improved machinability.

In every foundry where it is used, No. 8 Mexican Graphite produces similar improvements in finished castings. Machinability is greatly improved and the cost of metal control is lowered.

No. 8 Mexican Graphite is an especially prepared product, dustless and free of volatile matter. Packed in 100-lb. bags for easy handling, No. 8 Mexican Graphite effectively improves grey iron castings at a cost of less than 10c per ton.

If you are interested in treating your grey iron easily and at low cost, increasing machinability and obtaining a higher percentage of perfect castings, it will pay you to make ladle additions of No. 8 Mexican Graphite to your iron. Send us your casting problems and we will be happy to offer recommendations without obligation.



No. 8
Mexican Graphite

THE UNITED STATES GRAPHITE COMPANY • SAGINAW, MICHIGAN

(*Concluded from page 150*)

shop or office worker. In mechanizing, first step is to make an analysis and survey of each department; checking methods and costs. A layout of present facilities and operation should be made with each clearly marked. Then a layout of rearrangement of existing facilities should be prepared with the additions of such new facilities which are economically justified. In that way straight line flow of material with minimum rehandling can be secured with maximum unit production at lowest unit cost.—*Edwin Bremer.*

Northern California

FIRST meeting under the new officers of the Northern California Chapter, AFA, for 1945-46 was held Sept. 6 at the Engineers' Club, San Francisco, on a date which had to be selected in an emergency. This was to some extent responsible for a smaller attendance than had been planned. Charles Hoehn Jr., the new president, presided. After those present had introduced themselves, special introduction was made of the several new members and of committee chairmen for the coming year. These chairmen, with their supporting staffs, were admonished to do even a better job than has been done heretofore. The remarks of Richard Vosbrink, recently elected vice president of the chapter, assured his electors of their judgment.

President Hoehn reported on a meeting with the directors, which was held prior to the chapter meeting, and accepted the decision of the group that there be no Christmas party this year. He stated that they favored the annual golf party for October, and left with committeemen the question of dates and locations of near future meetings, during the period of transition in menus from "fish and fowl," to the chosen cut from a domesticated bovine. Chairman Hoehn attended the last conference of chapter chairmen in Chicago and regarded it of such importance that he gave an abbreviated resume of it.

Several items of local interest were discussed before the meeting was turned over to Program Chairman Andrew M. Ondreyco, who reported that the program for November would include a talk on "Refractories" by Gladding McBean Co., with a showing of its latest film. Mr. Ondreyco then presented Thomas E. Caldwell, assistant works metallurgist, Columbia Steel Co., whose subject was "Foundry X-ray Examination from the Metallurgical and Inspection Viewpoint." The speaker illustrated this important topic with slides, giving such interesting details that quite a lengthy question and answer period followed, as the discussion pertained to more than just steel castings.

Following the meeting, four applications for membership were received, as proof of progress expected for the coming term.—*George L. Kennard, secretary.*

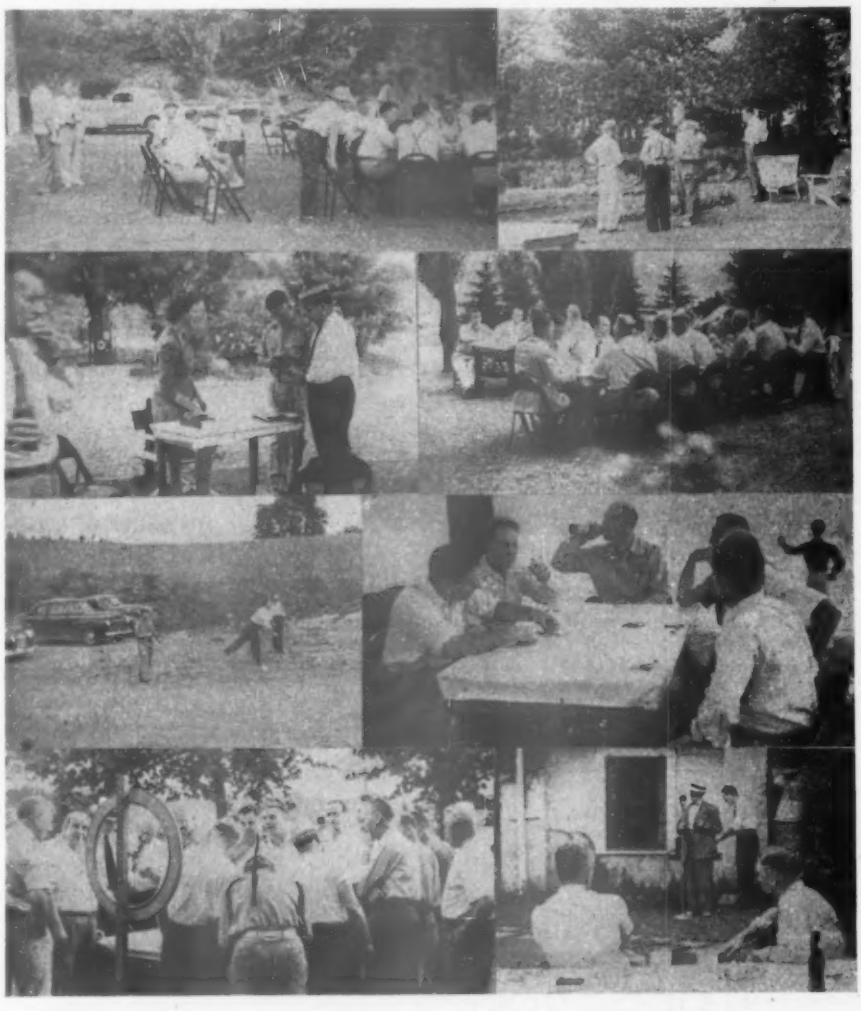
WPB Issues Guide on Labor-Management

Ways of operating a Labor-Management Production Committee are outlined in a 32-page booklet recently published by War Production Drive Headquarters, and which is a revision of the guide issued nearly two years ago. In a recent survey made by WPB Drive Headquarters, 66 per cent of the active labor-management production committees responding stated that they planned to continue after the war. Only 7 per cent said they would not continue; the others had not yet decided.

The guide is intended for management and labor groups which already have a committee or which may be considering the formation of one to aid them in meeting the changes which lie ahead. If they already have a committee and want to improve its methods, they can compare these with the methods of other committees as reported in the booklet. If they are in the process of organizing a committee, they can profit by the experience of those who have organized committees before them. Copies of the guide are available on request, War Production Drive Division, War Production Board, Washington.

Compiles Gray Iron Casting Statistics

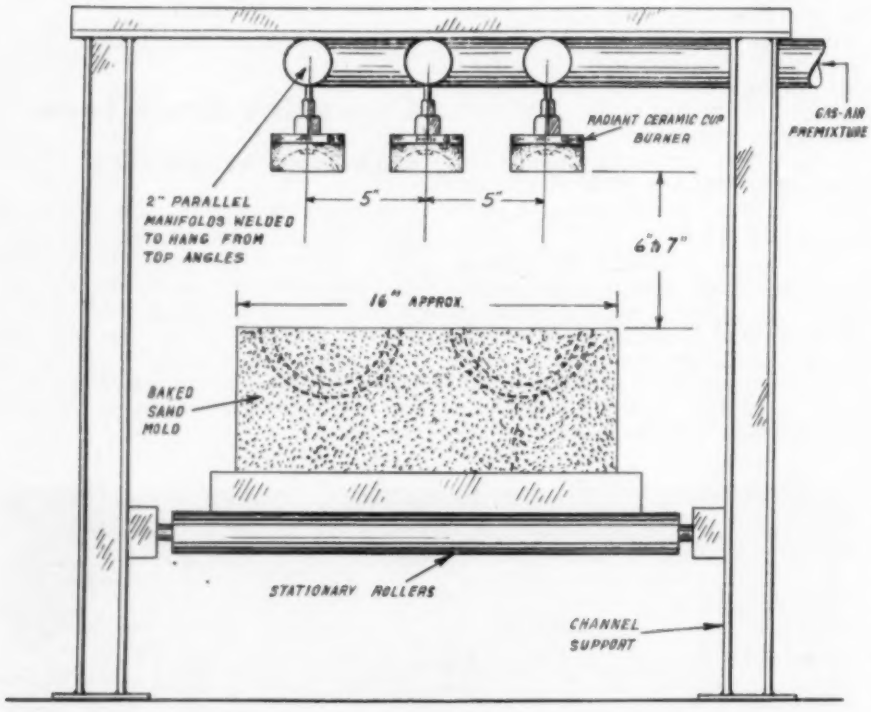
A comprehensive 14 page review of gray iron foundry activity has been compiled and published by the Department of Commerce, Bureau of the Census, Washington, and is available from that agency. It covers 1944 shipments, unfilled orders and monthly capacity of the industry, with separate figures for each of these classifications shown for individual states.



CANTON OUTING: The accompanying illustrations were taken Aug. 18 at the farm of Otis D. Clay, near Canal Fulton, O., where members and guests of Canton District Chapter, AFA, held their second annual stag outing. Those who did not care for weight lifting, tight-rope walking or lofty trapeze work, conducted round-table clinics on controlled directional solidification and on various other subjects somewhat foreign to metallurgy. A constant stream of coolant from an apparently inexhaustible source kept the machine in excellent condition from 3 to 10 p.m. (Photos courtesy of C. E. Shaw, American Steel Foundries, Alliance, O.)

SPRAY DRYING OF MOLDS

Speeded by Burner Arrangement



THE accompanying sketches illustrate a method employed by an aluminum foundry to speed up its drying of core molds for aircraft engine cylinder head castings. This arrangement was adopted when existing core oven capacity proved inadequate to perform a spray drying operation, and too much delay was involved in acquiring new ovens.

Previous practice was to bake the molds in conventional core ovens and, after spraying them with a fluoride solution, truck them back to the ovens for an additional 20-minute drying period. This not only involved considerable trucking but also crowded the ovens excessively, consequently it was decided to provide additional drying facilities. It would have been possible to dry the spray simply by playing a flame on the mold surface, but because of the deep fin sections of the mold this method, when attempted, often resulted in burning. A satisfactory setup was found in the radiant burner installation shown here.

This arrangement consisted of a roller conveyor over which the molds were pushed at the rate of approximately 2 ft per minute. Radiant type ceramic cup burners, furnished by the Selas Corp. of America, Philadelphia, were installed about 6 to 7 in. above the top face of the mold. The burners were screwed into manifolds on 5-in. centers, with three manifolds also on 5-in. centers running parallel to the conveyor. Originally 90 burners were used, split in two zones, each zone being piped to an individual mixing tee. Later 30 additional burners were added to bring the total length of heating area to 20 ft and make the drying cycle about 10 minutes. Manifold pressure was about 2 in. and consumption of natural gas was 5 to 6 cu ft per hour per burner.

Because of the type of burner employed and the fact that only a skin drying effect was required, the efficiency of the unit was not impaired to any marked extent by the absence of an enclosure or hood. In addition, workers suffered no undue discomfort from the heat when standing alongside the conveyor.

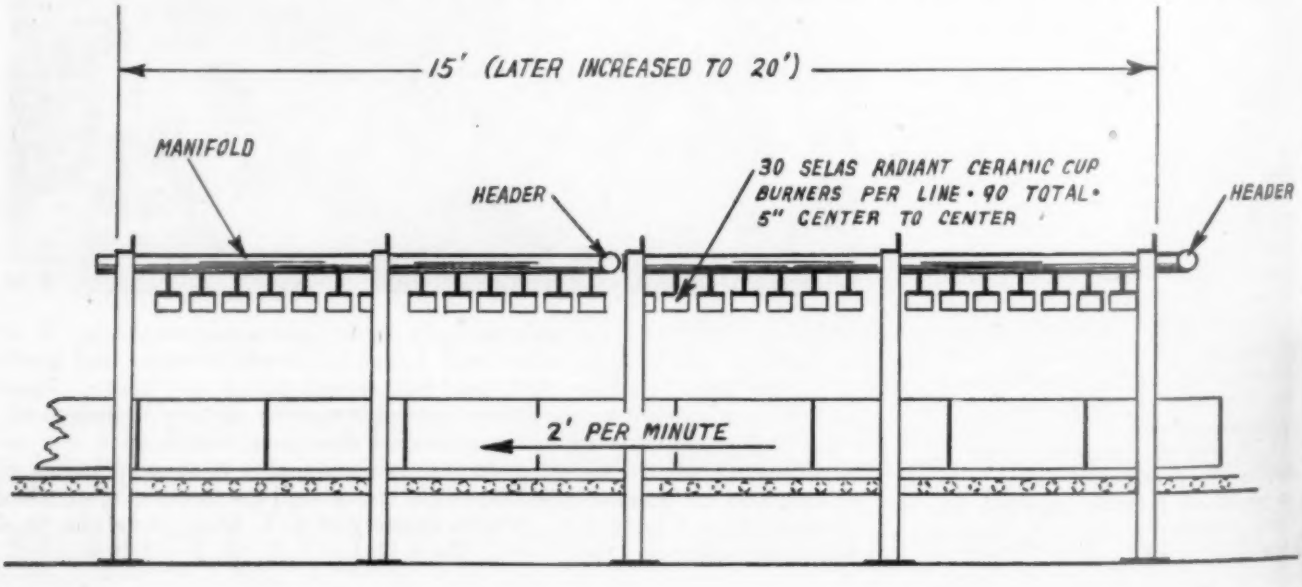
Offers Third Course In Quality Control

A 10-day course in "Quality Control by Statistical Methods" will be conducted Nov. 6 to 16 by the University of Iowa, Iowa City, Iowa. The third course of its type to be given, it is designed for executives, quality control supervisors, managers, industrial engineers, production men, designers, and persons in charge of specifications for materials.

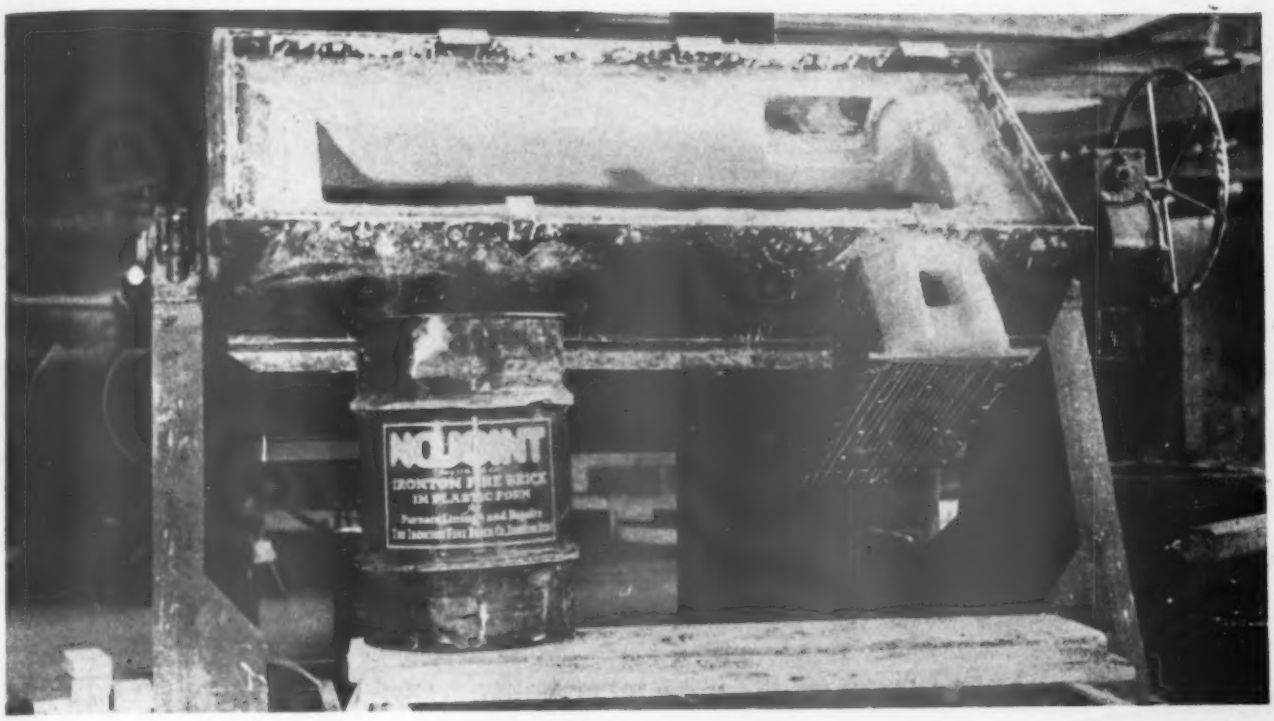
Book Review

How To Speed Up Settlement of Your Terminated War Contract, by J. K. Lasser, 186 pages, published by the McGraw-Hill Book Co., 330 West 42nd St. New York, 18, N. Y. Price $3.50.

The author of "Your Income Tax," "Your Corporation Tax," and other books has prepared this new work to help business men settle their war contracts. The text provides a step-by-step explanation of what to do and how to do it, how to handle plant operations, inventories and after receiving the termination notice. Various forms are reproduced and instruction for preparing them are given.


15' (LATER INCREASED TO 20')
MANIFOLD
HEADER
30 SELAS RADIANT CERAMIC CUP BURNERS PER LINE • 90 TOTAL • 5" CENTER TO CENTER
HEADER
2' PER MINUTE

"IRONTON NOJOINT" for Foundry Ladles



"Ironton Nojoint", a special type of plastic ramming refractory, is giving excellent service in forehearths, mixing ladles and desulphurizing ladles where fused soda ash is used. It lasts much longer than regular fire brick or special shapes because the solid, dense, monolithic lining of "Ironton Nojoint" is free of joints and is highly resistant to alkaline slags.

"Ironton Nojoint" is easily and quickly installed, it is economical to use and it is shipped in steel drums to prevent drying out in storage.

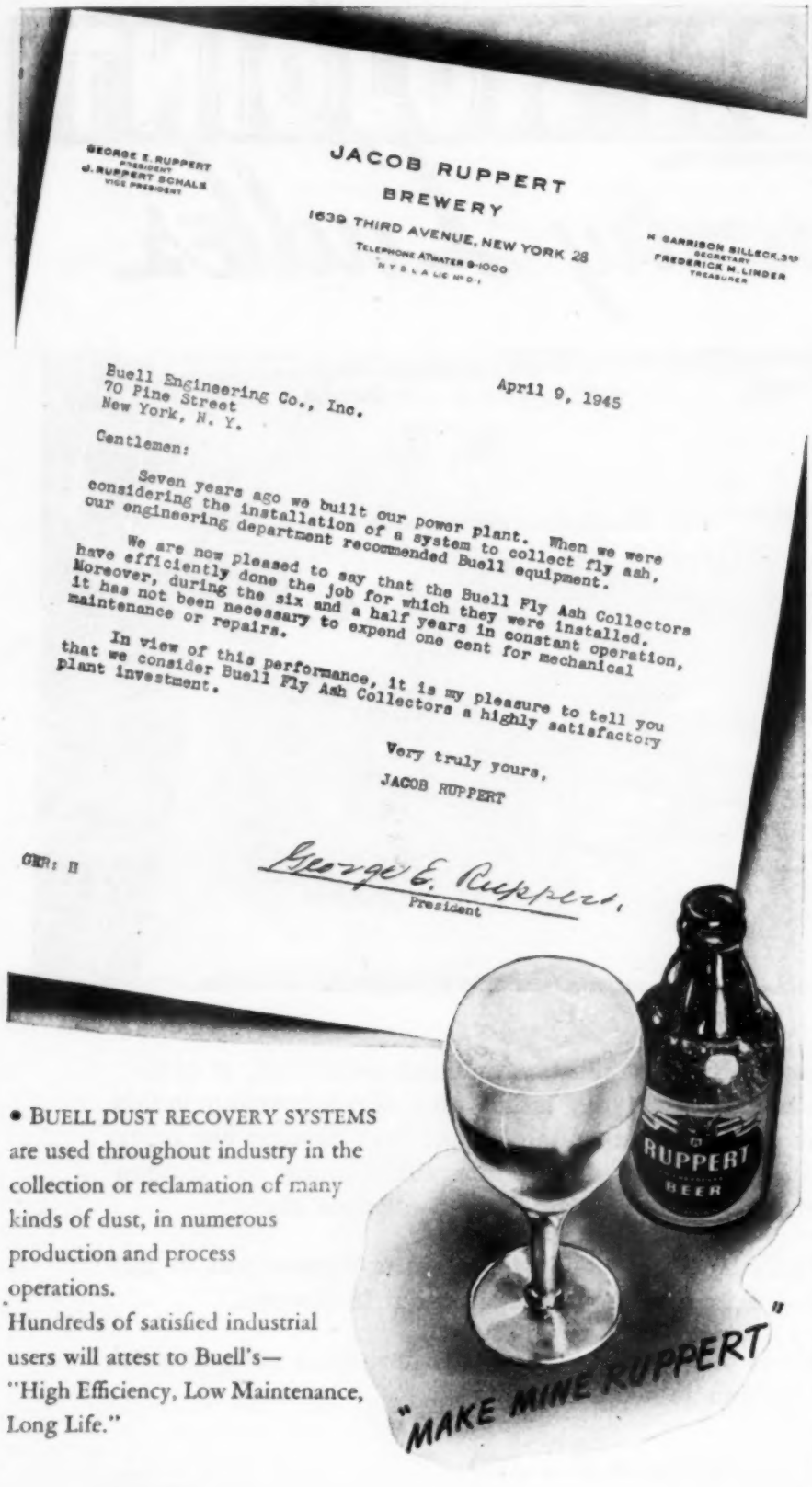
We offer you the assistance of a service engineer in installing your original lining and training your men to do the job.

Address Box 109

THE IRONTON FIRE BRICK COMPANY

RELIABLE REFRACTORIES

IRONTON OHIO



GEORGE E. RUPPERT, PRESIDENT
J. RUPPERT SCHALK, VICE PRESIDENT

JACOB RUPPERT
BREWERY
1639 THIRD AVENUE, NEW YORK 28
TELEPHONE ATWATER 9-1000
N. Y. S. L. A. LIC. NO. D-1

H. GARRISON SILLECK, JR., SECRETARY
FREDERICK M. LINDER, TREASURER

April 9, 1945

Buell Engineering Co., Inc.
70 Pine Street
New York, N. Y.

Gentlemen:

Seven years ago we built our power plant. When we were considering the installation of a system to collect fly ash, our engineering department recommended Buell equipment.

We are now pleased to say that the Buell Fly Ash Collectors have efficiently done the job for which they were installed. Moreover, during the six and a half years in constant operation, it has not been necessary to expend one cent for mechanical maintenance or repairs.

In view of this performance, it is my pleasure to tell you that we consider Buell Fly Ash Collectors a highly satisfactory plant investment.

Very truly yours,
JACOB RUPPERT

GER: H

George E. Ruppert
President

RUPPERT BEER

"MAKE MINE RUPPERT"

• BUELL DUST RECOVERY SYSTEMS are used throughout industry in the collection or reclamation of many kinds of dust, in numerous production and process operations.
Hundreds of satisfied industrial users will attest to Buell's—
"High Efficiency, Low Maintenance, Long Life."

buell
DUST RECOVERY SYSTEMS

BUELL ENGINEERING COMPANY, INC.
14 Cedar Street, New York 5, N. Y.
Sales Representatives in Principal Cities

DESIGNED TO DO A JOB, NOT JUST TO MEET A "SPEC"

Labor Shortage Hits Midwest Foundries

Labor shortage is holding gray iron foundry operations to not more than 60 per cent of capacity in four states adjacent to Chicago, and is causing one of the worst bottlenecks in stepping up production of civilian goods. This is the conclusion reached the middle of September, following a check of 131 foundries by WPB.

Of 76 foundries in Illinois, Indiana, Wisconsin and Iowa that replied to queries on whether they could accept more orders, 69 reported lack of labor prevented their having more production capacity available. One shop in an area where labor is available said that only one of 50 applicants directed by USES would take a job in the foundry.

Open capacity was reported by only seven foundries—two for gray iron, two for malleable iron and three for cast steel.

New Color Film By Ampco Metal

A new industrial 16 mm color film, "Golden Horizons," has been produced by Ampco Metal Inc., Milwaukee. The film shows the development of copper-base alloys from the first discovery of copper by primitive man. The alloying of bronze, and its growing importance are colorfully portrayed. Written, produced and acted by Ampco employees, the film with narration and sound, was produced for showing before schools, engineering and technical societies, and similar groups interested in metals and shows the importance of controlled supervision of alloying.

Book Review

A.S.T.M. Specifications for Steel Piping Materials, paper, 337 pages, published by the American Society for Testing Materials, 260 South Broad street, Philadelphia 2. Price $2.

This compilation contains all the specifications for carbon steel and alloy steel pipe and tubing issued by the society as well as those covering castings, forgings, bolts and nuts used in piping and related installations. The specifications relate to materials used to convey liquids, vapors and gases at normal and elevated temperatures, still tubes for refinery service, heat exchanger and condenser tubes and boiler and superheater tubes. In addition the volume contains emergency alternate provisions for some of the materials.

Hamilton Foundry & Machine Co., Hamilton, O., has been granted a fourth renewal of its Army-Navy "E" Award. The original award was granted in August, 1943.

Many foundries find one molybdenum steel analysis suitable for all their castings, whether normalized or quenched and tempered.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

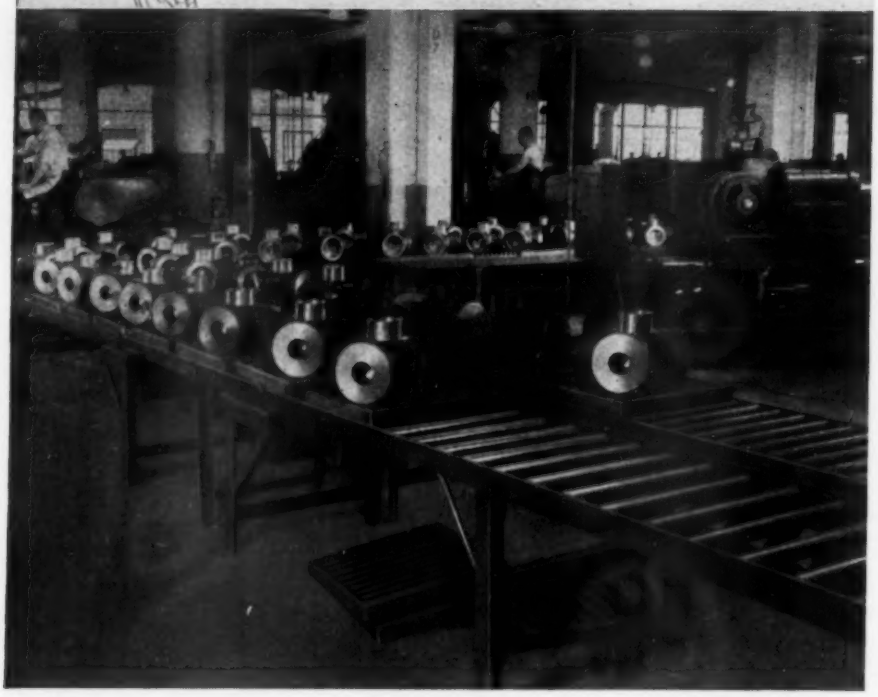
MOLYBDIC OXIDE, BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Molybdenum Company

500 Fifth Avenue · New York City

MOLY

INDUSTRIAL "GOOD HOUSEKEEPING" *Pays Dividends!*



...A CONVEYOR-COORDINATED PLANT IS USUALLY A CLEAN, EFFICIENT PLANT

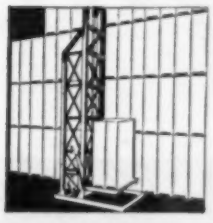
ORDER and cleanliness — freedom from congestion—smooth flowing channels for production — safety for workers — these are important additional advantages gained from conveyors — they contribute substantial added savings to time and handling-cost economies conveyors provide.

The steps you take now — the investment in conveyors that you make at this time to coordinate your production — eliminate disorder and confusion — cut your handling costs — will not only pay immediate dividends but yield an even greater return in the days of competitive production to come.

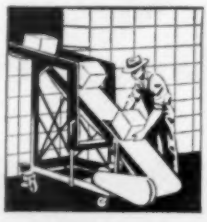
Knowing how to apply power and gravity conveyors to best advantage is equally as important as building them well. An experience record of more than 40 years, serving all classes of industry and business, qualifies Standard Conveyor to be of service to you.

Write for valuable reference book "Conveyors by Standard," Catalog No. F105.

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities



TIERING AND LIFTING MACHINES



PORTABLE PILERS

SPIRAL CHUTES

PNEUMATIC TUBE SYSTEMS

INSULATING PADS AND RISER SLEEVES

(*Continued from page* 93)

to be very large, and temperature gradients carefully controlled by gating into or through risers as much as possible, so that the metal in the riser is kept molten and molten metal contact is maintained with all solidifying portions of the casting until they are completely solid.

In spite of this it is general practice to gate tin bronze castings into thin sections away from risers and to use few and small risers as compared to those used for similar manganese bronze castings. This is due to the fact that such a practice distributes shrinkage uniformly and it is not readily noticed upon casual examination. The use of risers which seem large to foundrymen, and yet are really not large enough for their intended purpose, serve only to localize shrinkage underneath them, shrinkage which can be readily found. Gating under or through inadequate risers aggravates the condition. However, adequate risers do give sound castings, even in tin bronzes, particularly when temperature gradients are favored by gating through them, and it is not possible to make perfectly sound castings by circumventing this principle. The demand upon risers can be lessened and castings made very sound by an extensive use of chills, a practice which is rapidly gaining favor among foundrymen.

Insulating Pads Unsatisfactory

For many years attempts have been made to develop a suitable material from which to make insulating pads and riser sleeves for steel castings as an aid in promoting proper temperature gradients within a solidifying casting. This is common practice for ingot making in which sand is an effective insulator relative to the metal of the ingot mold. However, no suitable material has yet been found for steel castings and the closest approach to effective riser insulation is the use of powdered compounds placed on the surface of the metal in the riser to decrease radiation of heat and to insure against premature solidification.

Except as a means of keeping the risers open to the atmosphere, riser compounds are relatively ineffectual as their influence does not extend to the base of the riser, where insulation is needed most in order to prevent early solidification at the neck. The commercial use of gypsum as a mold material for making nonferrous castings and its well-known insulating effect when used for this purpose suggested it as a material with which to accomplish in the nonferrous field that which, so far has not been satisfactorily accomplished for casting of steel. Gypsum cannot be used with ferrous metals because of the reaction between the sulphur of the gyp-

(*Continued on page* 160)

To Do Better Jobs in Less Time,
Specify These Tested Grinding Wheels

By creating special bonds and incorporating them in proper proportions in correctly designed wheels of certain grain size and structure, Sterling technicians have been able to produce units built to meet the particular demands of any industrial grinding job.

There is no grinding problem which cannot be readily solved by using the correct "Wheels of Industry". For sixty years, we have been producing them in any quantity for any job.

The success others have enjoyed by using Sterling Grinding wheels can be yours. May we show you how your post-war production can be speeded up by putting them on your machines? No obligation—write today!

Send for catalog 45, just off the press. It is a handy book to have around when you have to answer questions about proper grinding.

• STERLING ABRASIVES •

THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

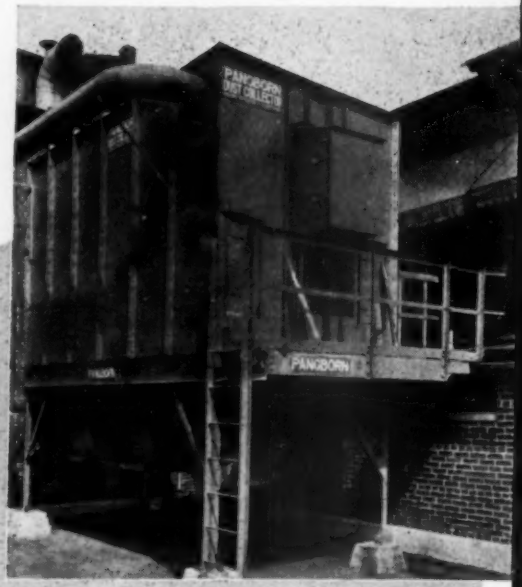
THE WHEELS OF INDUSTRY

DUST CONTROL

ARMY E NAVY

EFFICIENT & EFFECTIVE

Thru PANGBORN
• ENGINEERING
• EXPERIENCE
• RESEARCH



All Dust Control systems do not have the benefit of an exact and separate engineering service, covering forty years experience in the field, and scientific research to assure progress and development. These ingredients are available in Pangborn Dust Control and provide outstanding qualities which serve to guarantee efficient and effective solutions to industry's many and varied dust problems.

The Pangborn Dust Control department is chiefly concerned with the task of correlating and evaluating the many facts about industrial Dust Control which it has gleaned from its many years of service to industry. These facts—results of actual operating experience in the field—have a great bearing on the design and construction of the equipment which is offered to industry to combat the great variety of problems.

These facts are tested and proven in a complete research laboratory, whose job it is to make sure that each piece of Pangborn equipment will satisfactorily handle the work to which it is assigned. Pangborn's three-pronged offensive against industrial dust—Engineering, Experience, Research—is a guarantee of complete and exacting coverage for your dust problem—use these facilities today and be sure of the best in Dust Control!

"Pangborn Dust Control Is Protection For Production"

PANGBORN

WORLD'S LARGEST MANUFACTURER OF DUST COLLECTING AND BLAST CLEANING EQUIPMENT

PANGBORN CORPORATION · HAGERSTOWN, MD.

(*Continued from page* 158)

sum and the iron.

Figs. 1, 2, 5, and 12 illustrate practical examples of the insulating value of gypsum when used in a mold for casting copper base alloys. Figs. 1 and 2 show the first experiment made to determine the relative rates of heat transfer through sand and gypsum molds. One half of the mold was made completely in gypsum and the other half in green sand. The casting cavities were gated identically, were of identical dimensions, and thermocouples were placed so the temperature would be measured in the center of each mold. The metal used was manganese bronze poured at 1025 C. The time for complete solidification as indicated by the thermocouples was more than twice as long in the insulated metal as in the uninsulated metal, Fig. 3.

It is interesting to note the difference in temperature of the metal at the time of the first reading, indicating immediately the relative insulating properties of the gypsum and the much greater absorption of heat by sand as the metal flowed over it. It will be noticed from the curve that the liquid metal inside the insulated casting approaches the solidus range much slower than it does in the sand casting, and a supply of liquid metal is available for a longer period of time to feed the shrinkage of a solidifying casting.

Measure Metal Fluidity

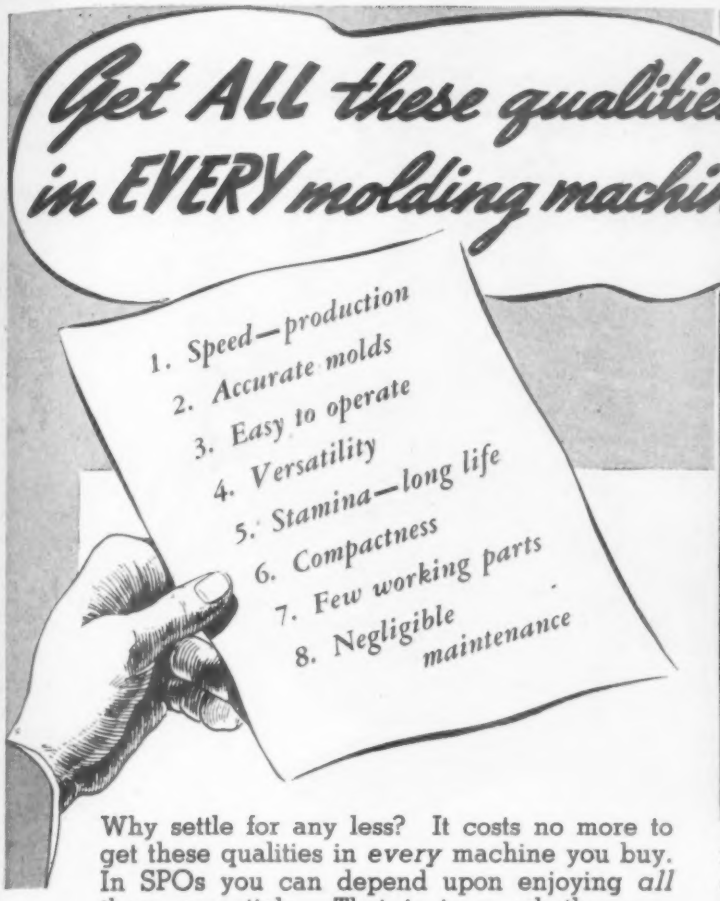
Fluidity spirals are used at the Naval Research Laboratory as a means for indicating the flow behaviour (fluidity) of molten steel[6]. The length of flow is taken as a relative index of the fluidity of the metal. The spiral length is really an indication of how far the metal will flow before enough heat is lost to the mold to cause solidification. Fig. 12 shows a pair of such spirals, one poured in a gypsum mold and the other in sand. The relative length of 34 in. for the gypsum and 15 in. for the sand indicates in a rough way the relative insulating values of the two materials. Pure copper was used for the experiment. Both spirals were poured at 2150F.

Figs. 4 and 5 illustrate still further the good insulating properties of gypsum. Fig. 4 is a sketch showing how the casting was made. An octagonal cavity in a green sand mold was filled by pouring molten manganese bronze through the open top. The metal was covered with an insulating powder after filling the mold. As shown in the sketch, each alternate face of the octagon was formed with a slab of the material to be tested. At the end of 5 minutes the cope and drag molds were separated and the unsolidified metal was bled out. Fig. 5 is a section through the center of the casting, and the lack of solidification on the gypsum face is clearly indicative of the insulative properties of this material.

This test demonstrates how effectively several of the well-known materials can be used to promote the vitally important directional solidification within a

(*Continued on page* 164)

Get ALL these qualities in EVERY molding machine

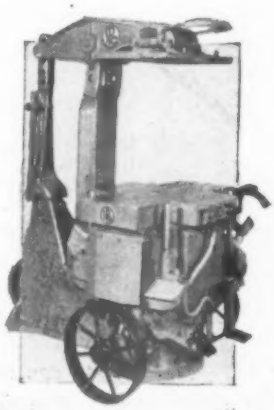


1. Speed—production
2. Accurate molds
3. Easy to operate
4. Versatility
5. Stamina—long life
6. Compactness
7. Few working parts
8. Negligible maintenance

Why settle for any less? It costs no more to get these qualities in *every* machine you buy. In SPOs you can depend upon enjoying *all* these essentials. That is true, whether you are equipping for long or short runs, for light, semi-heavy or heavy work, or for all-around versatility which enables you to handle many different types of jobs.

Production? Yes, to meet the new demands of reconversion. Accuracy? Right, to satisfy new standards of accuracy more rigid than ever before. And both "pictures" are here to stay. The eight points listed above insure results in both respects, outstandingly so. On top of them, you profit from stamina and simplicity of design which are also "musts". Every SPO Molding Machine is sold with service—service that insures efficiency and economy to the highest degree.

We shall be glad to send you a bulletin on the SPOs shown here or on any other series.



SPO No. 200 Series, jolt squeeze strip machines, cantilever type. Profitable for jobbing and fast production of cope and drag molds.

SPO No. 200 Series, jolt squeeze strippers, post type. Real production machines adjustable to a wide range of flask sizes and shapes.

SPO No. 100 Series, jolt squeeze strip machines, cantilever type. Fast and flexible, for producing a wide range of matchplate molds.

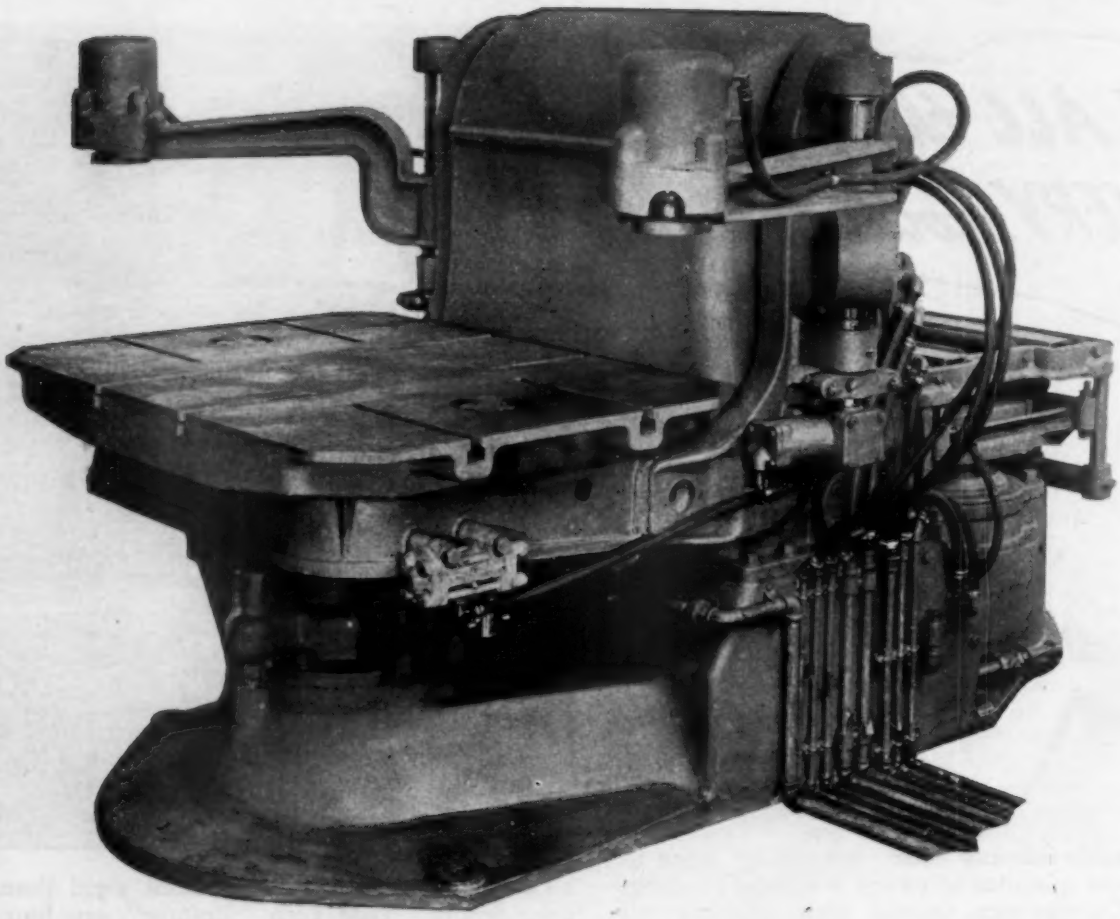
MEMBER MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

SPO

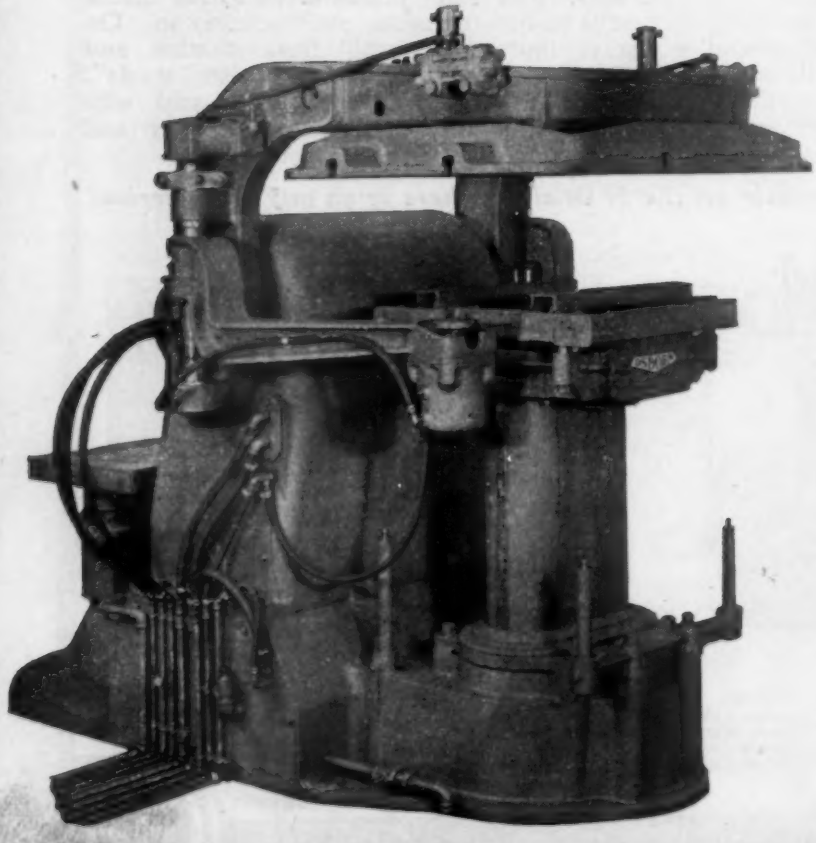
INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

7500 GRAND DIVISION AVENUE · · CLEVELAND 5, OHIO



Osborn 643 Jolt-Rockover-Pattern Draw Moulding Machine, shown with table rocked over in draw position. Note scale on draw unit which permits quick adjustment to proper flask space.



MEMBER
MANUFACTURER'S ASSOCIATION, INC.
FOUNDRY EQUIPMENT

Osborn 643—Note heavy construction, designed to absorb shocks. Weight of the machine is approximately 4½ times its jolt capacity.

ARMY E NAVY

THE OSBORN MANUFACTURING COMPANY
5401 Hamilton Avenue Cleveland, Ohio

HAVE YOU SEEN OSBORN'S

New JOLT ROCKOVER

THE OSBORN 643 Jolt-Rockover-Pattern Draw Moulding machine is the latest addition to this outstanding line of foundry equipment. It gives you a combination of features and improvements which we believe no other machine of this type can duplicate. For instance:

Full power-operated air clamps for both swing-in and clamping. The operator does not have to leave his valve station once the bottom board is placed in the mould.

Hydraulic draw unit assures steady movement throughout stroke, regardless of variations in load.

Roller mechanism for discharge of mould from machine can be easily arranged for either side or end roll-off.

Larger area of contact between jolt table and rockover platen, combined with a long jolt piston, provides prolonged-accurate alignment of jolt operation.

The Osborn 643 provides improved rockover operation with full power control through dead center. Rockover platen locking mechanism has been simplified for easier maintenance. Overall flask width is 40″ with 2000 lb. jolt capacity.

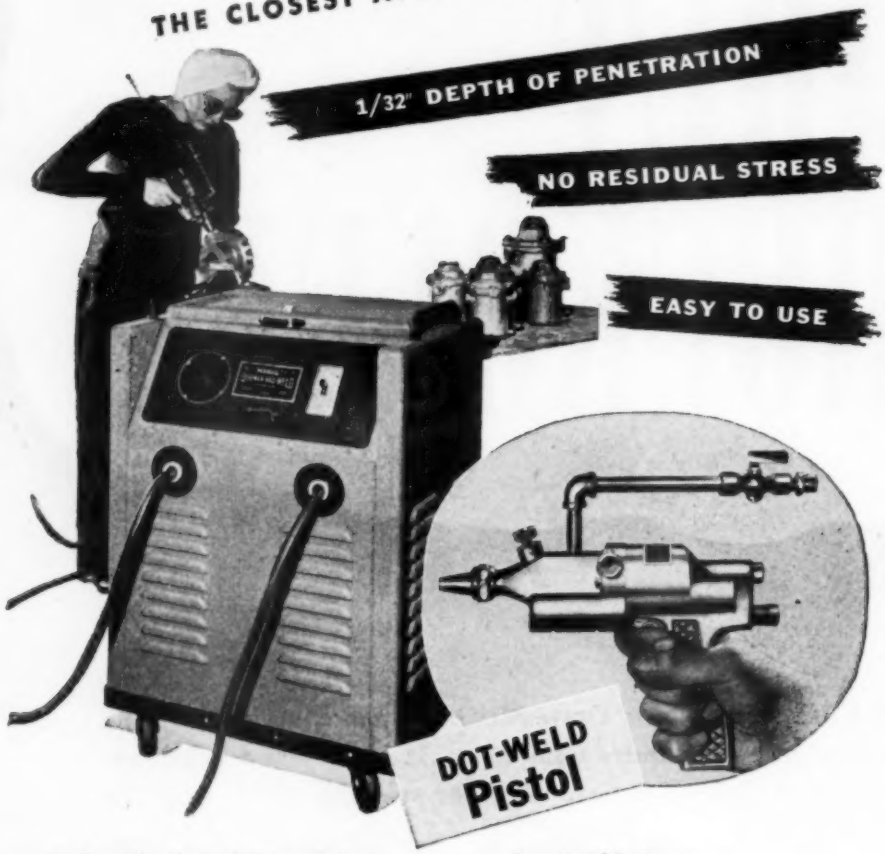
OSBORN

MOULDING MACHINES

Salvage Defective Castings by the New Mogul

•DOT-WELD PROCESS

THE CLOSEST APPROACH TO A COLD WELD



Process and Equipment PATENTED

Using the Mogul Quench-Arc-Weld Machine and the Dot-Weld Pistol

Now you can reclaim defective ferrous and some non- ferrous castings without fear of setting up residual stresses, or crystallization by the Dot-Weld Process. It affords a fast fill-in of aluminum, nickel, bronze or zinc which can be applied to any metal and is readily machineable. In addition to reclaiming defective castings, Dot-Welding is being used for press fit work, local nickel clad to eliminate corrosion and other applications never before possible.

DOT-WELDING UTILIZES the new Mogul Quench-Arc-Weld Machine, a high amperage, low voltage transformer and the unique Dot-Weld Pistol. This combination affords a depth of penetration up to 1/32" yet the specially designed air pressure unit of the pistol quenches the arc in a constant stream of cooling air.

No foundry, machine, welding or pattern shop can afford to be without the remarkable Dot-Weld Process.

METALLIZING COMPANY OF AMERICA
INDUSTRIAL DIVISION
1330 Congress Street, Chicago 7 135 Cedar Street, New York 6

WRITE FOR NEW BULLETIN

(*Continued from page* 160)

mold cavity. The two contrasting materials being steel and gypsum, the former producing a wall thickness of 1¾ in. while the latter had retarded the heat flow so drastically that no skin had formed after the 5-minute period. From this experiment alone it can readily be seen that using these materials in conjunction with conventional mold mediums a much greater control of directional solidification is available.

In order to test the practical value of pads and riser sleeves made from gypsum two typical castings were selected, one involving cored holes and thin sections and the other a solid mass containing troublesome internal corners. Fig. 6 is a photograph of an actual casting and Fig. 7 illustrates schematically the molding technique used and the dimensions of the casting. In Figs. 8 to 11 inclusive, four sectioned manganese bronze castings of this type are shown; each was made differently to illustrate the advantages of gypsum insulators. The casting of Fig. 8 was made completely in sand by ordinary foundry technique. No chills or insulators were used, and no insulating powder was used on the top of the riser. Extensive shrinkage is evident in the heavy section at the lower corner beneath the riser. Feed metal could not reach this heavy section to accommodate shrinkage because the thin section solidified first and prevented further feeding. It is important to note the typical secondary shrinkage of the riser in the central portion.

Insulation Prevents Shrinkage

In the casting of Fig. 9 no change was made except to place a small pad of gypsum against the thin section at the end, as shown in the sketch of Fig. 9, to retard solidification in this area and make it possible to feed the heavy corner section. The casting is sound and adequate feeding has been accomplished.

In Fig. 10 no insulating pad was used at the light section but the casting was made with insulating sleeves around the riser and with insulating powder on top, as is indicated. By careful examination a very small pinpoint cavity of shrinkage is evident in the heavy corner section, but the casting is very nearly sound and feeding is almost adequate even though no pad was used on the thin end section. The insulating effect of the sleeves extends far enough to cause the thin section to remain open long enough to nearly feed the shrinkage in the heavy section. The absence of any trace of secondary shrinkage in the riser and the flatness of the top are very important features of risers cast in gypsum insulators.

The risers of Figs. 8, 9, and 10 were all filled to the same height originally, but the final riser height of the insulated riser of Fig. 10 is ⅜-in. shorter than the others. This indicates that the metal in insulated risers settles as a molten body and does not freeze along the walls as in the case of sand risers. The signifi-

(*Continued on page* 166)

They "had to be shown"...

RADIOGRAPHY teaches sound practice...rejections tumble 66⅔%

BASED primarily on a foundry experience, this case history applies to *all* industry, for product quality demands suitable methods of production, and instruction is a widespread problem.

In this particular case, customer rejections were running 45%. Yet to the workmen the returned castings looked perfect. But metallurgical investigation, with radiographs of the internal structure, revealed unacceptably large grain size—due to improper pouring temperatures. The findings were passed on to the foundry.

Believing the workmen needed only "to be shown," 4 melts were poured in one day—each at a higher temperature—and radiographed to show exactly what happened inside the metal . . .

First melt, poured at 1250°F., was clearly acceptable . . . had a fine grain structure. Additional melts, poured at 1350° F., 1450° F., and 1550° F., were increasingly grainy and porous . . . indicating graphically why rejections had reached 45% of production totals. Convinced, the workmen adopted the satisfactory 1250° F. pouring temperature as standard. Rejections dropped to less than 15%—an immediate improvement of 66⅔%.

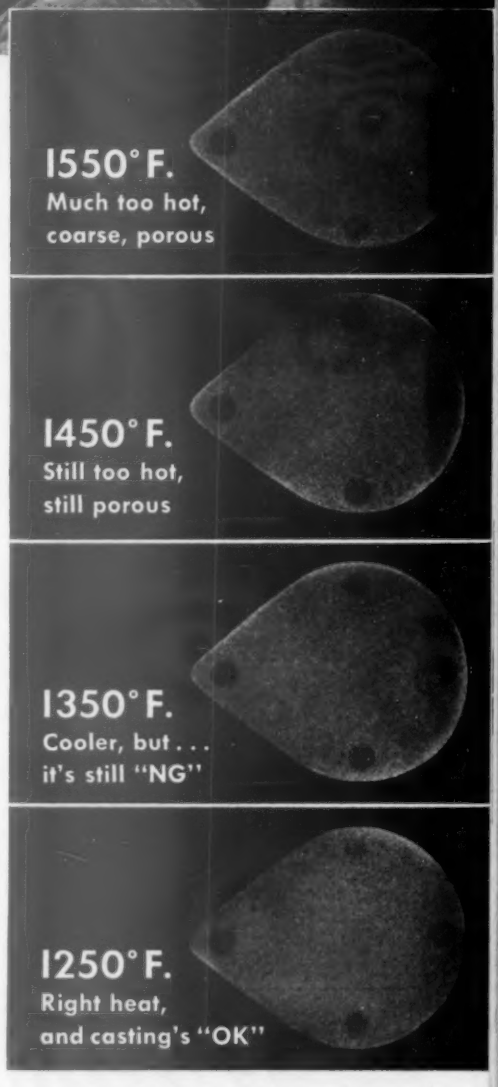
The story is food for thought, indicates the versatility of industrial x-ray. For radiography is more than an inspector of internal conditions . . . it's a teacher . . . a "prover," too. Engineers and designers in all fields use radiography to obtain basic information leading to better products . . . streamlined operations.

Radiography's success suggests it as an absolute "must" in the keen competition ahead. Investigate its possibilities in your plant. See your local x-ray equipment dealer. Do it now.

EASTMAN KODAK COMPANY, X-ray Division, Rochester 4, N. Y.

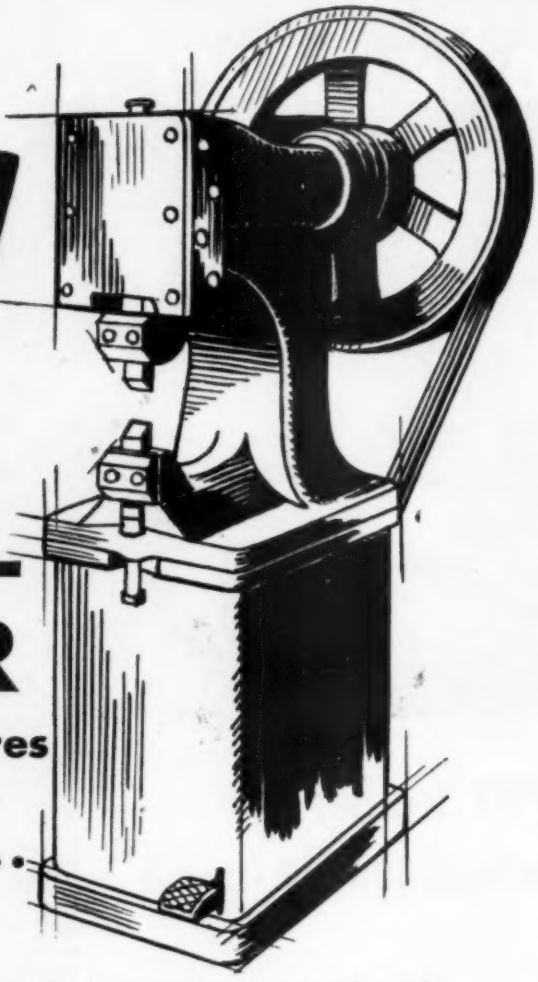
RADIOGRAPHY

ANALYZES . . . INSTRUCTS . . . CORRECTS . . . IMPROVES



STEP BY STEP—at temperature intervals of 100° F.—these melts were poured and x-rayed. Range of graininess and porosity is clear and proves definitely the correct heat for pouring sound castings.

Kodak



NEW

TESSMER
SPRUE-
CUTTER

Has the Features
You've Been
Waiting For . . .

1. **Improved Clutch** — Simple, rugged, conventional punch-press type, designed for continuous, trouble-free service.
2. **New Brake** — One-piece flexible-band style. Larger braking surface assures positive, accurate control.
3. **Rear Cam Rod Bearings** — Enclosed in separate, removable bracket. Makes all clutch parts easily accessible.
4. **Knife Caps** — Steel tapered end type with no protruding nuts. No danger of pinching operator's fingers; provides work-piece freedom.
5. **Alemite Lubrication** — Makes it easy to lubricate all moving parts.
6. **Foot Pedals** — Placed at right side of base . . . enable operator to work with natural movements, in normal position.
7. **Massive Steel Base** — Results in less weight with greater strength and rigidity.
8. **V-Belt Drive** — If motor is mounted in base.
9. **Shelving in Base** — For storage of tools and equipment — if machine is not motor driven.

These features mean higher postwar standards of performance, workmanship and service for the famous Tessmer Sprue-Cutter — a top favorite in the cleaning departments of non-ferrous foundries for many years. Available NOW. Write for particulars.

Milwaukee
CHAPLET AND MANUFACTURING CO.
1025 S. 40th STREET • MILWAUKEE 4, WIS.

A 4867-3/3

(*Continued from page* 164)

cance of this is very important as it means all the molten metal in the riser is available for feeding over a greatly extended period of time, whereas, with the riser in sand, a late feed demand within the casting must be accommodated by metal draining from the central part of the riser. The results of the thermocouple experiment discussed previously indicate also that the feed metal in sand risers is colder and less effective than in insulated risers.

Fig. 11 shows a casting in which the riser size was reduced nearly to a minimum by the use of a gypsum sleeve and necked down to facilitate removal from the casting. An insulating pad was used at the thin section. Made in this way the casting is sound, the riser is easily removed, and the amount of riser metal is small. No attempt was made to develop optimum gating conditions. The technique shown is not recommended as best and any number of gating systems could just as readily have been used.

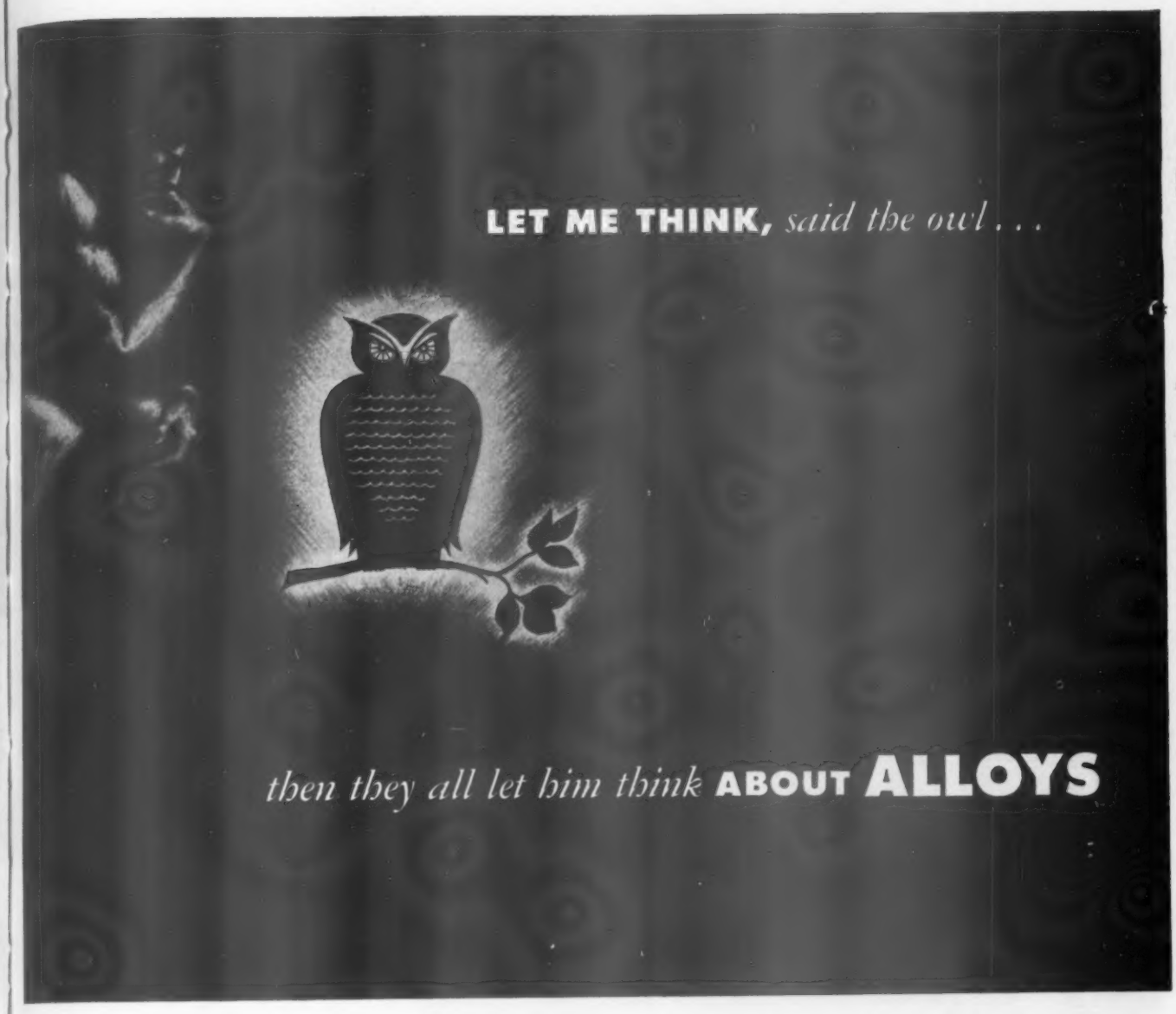
The castings of Fig. 15 are of manganese bronze and were made by pouring the molten metal directly into the risers. The castings were poured vertically as shown. The casting at the left, Fig. 15-A (weight 18½ lb) was made in a sand mold with the riser in sand and the one at the right, Fig. 15-B (weight 13½ lb), in a sand mold with the riser insulated. Due to the secondary shrinkage evident in the uninsulated riser it could not have been made materially smaller without producing unsoundness in the casting.

Large Risers Normally Used

The second test casting chosen was the type shown in Figs. 13 and 14. Because of the compact mass and sharp internal corners such a casting is usually difficult to make in the foundry unless extremely large risers are used. The sketch, Fig. 14, gives the details of the casting, gate and insulated riser. Fig. 13 is a photograph of a casting made with an insulated riser.

Figs. 16, 17, 24 and 25 inclusive are photographs of sections of solid tee castings made as indicated. Several very interesting and important metallurgical and foundry principles are evident from these illustrations. For example, the effect of atmospheric pressure is clearly shown in Fig. 16. The riser, being too small in size and uninsulated, froze prematurely at the neck and could not supply molten metal to feed the shrinkage taking place in the casting. As a result, a partial vacuum was created within the casting, setting up a difference in pressure between the inside and outside of the casting which exceeded the strength of the solidified skin of metal, and the walls were forced inward at the internal corners. The extensive tear is actually caused by this condition, and if the casting were thoroughly sectioned and examined it would be likely that filaments of the tear actually reached through the solid wall and made contact between the in-

(*Continued on page* 168)



Experience in wartime will have its values for the period to follow and all the newly developed possibilities of alloyed metals are not likely to be forgotten. When our swords are beaten into plowshares and our spears into pruning hooks, the same elements that gave matchless quality to war weapons will do likewise for the implements of peace.

It is only because they were indispensable for war that certain alloys have been withheld from civilian use and alternative materials have for the moment been made to serve. Each will find its own place before long and whatever may be said of other things it is clear that alloys will claim not only larger but more discriminating employment.

The uses of Molybdenum, Tungsten, and Boron in their various forms and combinations are described in the literature of the Molybdenum Corporation. Correspondence is invited.

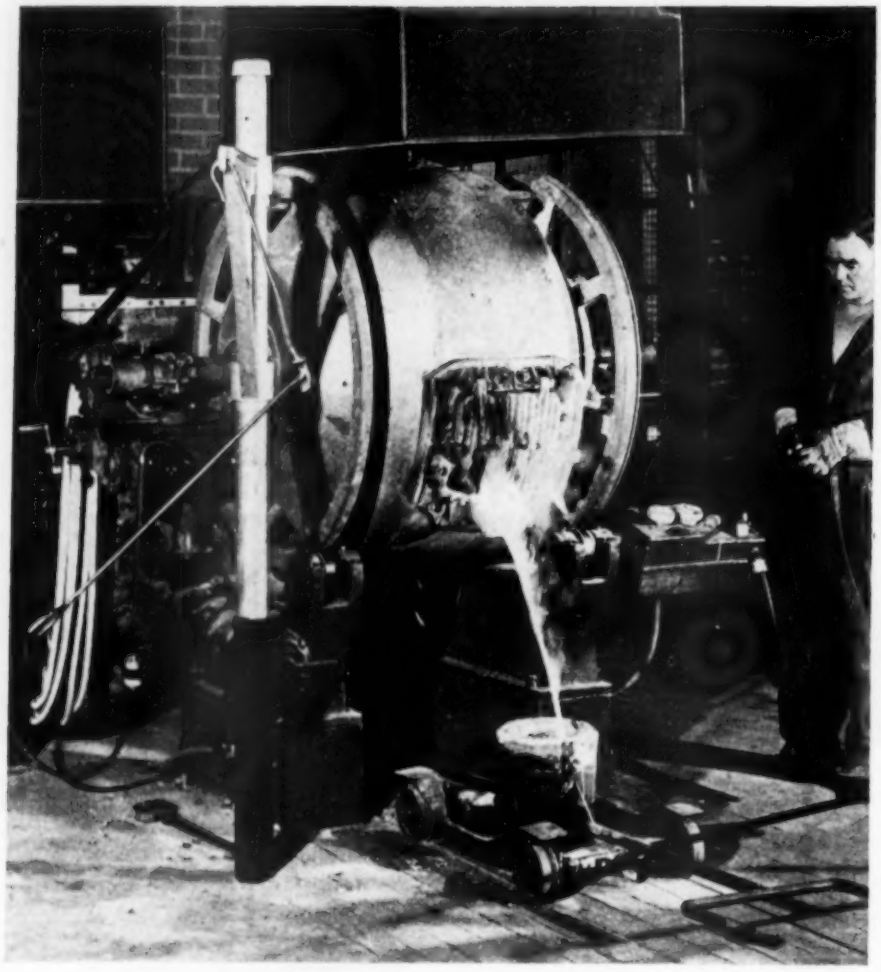
AMERICAN Production, American Distribution,
American Control—Completely Integrated.
Offices: Pittsburgh, New York, Chicago, Detroit, Los Angeles, San Francisco, Seattle.
Sales Representatives: Edgar L. Fink, Detroit; H. C. Donaldson & Co., Los Angeles, San Francisco, Seattle.
Works: Washington, Pa.; York, Pa.
Mines: Questa, N. M.; Yucca, Ariz.; Urad, Colo.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

40 minutes per heat with a

Detroit Rocking Electric Furnace



700 lbs. every 40 minutes! That's the productive speed of a Detroit Rocking Electric Furnace which was clocked during a typical day's operation melting bronze for valve castings. Melting time was approximately 30 minutes; charging and pouring time approximately 10 minutes per heat. Over all average power consumption 275 Kw Hrs. per ton. Records like this are being made in scores of brass and bronze foundries using Detroit Electric Furnaces. They can be duplicated in your own foundry with this fast melting, flexible furnace Write for complete information.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY, MICHIGAN

(*Continued from page* 166)

side cavity and the atmosphere. The casting shown in Fig. 17 was made identical to that of Fig. 16 with the exception of a gypsum sleeve around the riser and powdered gypsum on top of the riser. Both castings were made of manganese bronze which was poured at 1000C (1830F).

Figs. 24 and 25 show castings made as those of Figs. 16 and 17 except that composition "G" bronze was used. The sections were etched in a solution of 1:1 nitric acid and water, in order to show the typical shrinkage at the internal corners of the casting of Fig. 24 made without insulating the riser. The interdendritic type of shrinkage in tin bronzes is not readily apparent to the eye on polished surfaces unless they are etched, whereas the piping type of shrinkage in manganese bronze is clearly evident. The broken, undefined grain seen at the internal corners of Fig. 24 depicts shrinkage and the slight caving in of the corners again shows the effect of atmospheric pressure acting on a low density area. The risers of the two manganese bronze castings, Figs. 16 and 17, were poured to the same height originally. As in the previous instance discussed the metal in the insulated riser has settled down as a body and no secondary shrinkage is present. This same phenomenon is shown in a somewhat lesser degree in a comparison of Figs. 24 and 25.

Compare Four Castings

Fig. 18 is a photograph of four identical castings made in the same mold to insure as nearly as possible identical pouring conditions. Two of the castings were made with insulated risers and two were not. The metal used to pour these castings was composition "G" bronze, 88 Cu, 9 Sn, 3 Zn. Poured at 1150C (2100F) one pair of castings was used to study physical properties by cutting blanks for tensile specimens from the positions shown in the sketch in Fig. 19. The results of this comparison are shown in the Tables 1 and 2 on either side of Fig. 19, and the casting made with the insulated riser proved superior in soundness as shown by the tensile properties.

The other two castings were sectioned and a ½-in.-thick slab was removed transversely from the center of each. This thin slab was x-rayed and later etched to show relative soundness. The results are shown in Figs. 20 to 23, inclusive, which are self-explanatory. To the casual observer the macrostructure shown in Fig. 20 might not be particularly disturbing because the shrinkage is not evident as extensive voids. However, the x-ray of Fig. 21 shows the defect in its true light. Adequate feeding is not present. No insulation of any type was used on this riser. The casting of Figs. 22 and 23 is sound and shows no porous areas when etched or x-rayed. Again much significance can be given the metallurgical and foundry principles displayed in these photographs.

(*Continued on page* 171)

Do You want to Cash In on All These Advantages with Merely a Hand Shovel?

¶ Do you want to save time by eliminating hard lumps and difficult shake-out, as well as excessive jolting and slow ramming?

¶ Do you want to jump production by avoiding drops, swells, cuts, and cracked castings?

¶ Do you want to improve quality by a better finish on your castings?

¶ Do you want to save gaggers and nails, to reduce scrap, and to lengthen flask life? With

DIXIE BOND

you can definitely enjoy these advantages. It gives you a sand with high flowability, moderate dry strength and very high green strength. ALL THIS, *without the necessity of mechanical* mixing. *Ask for our descriptive bulletin.*

Remember, please, that ECP service engineers have *five* bonding clays and their many combinations from which to give you the one right recommendation for your purpose and to insure your receiving the *most bonding strength for your dollar.*

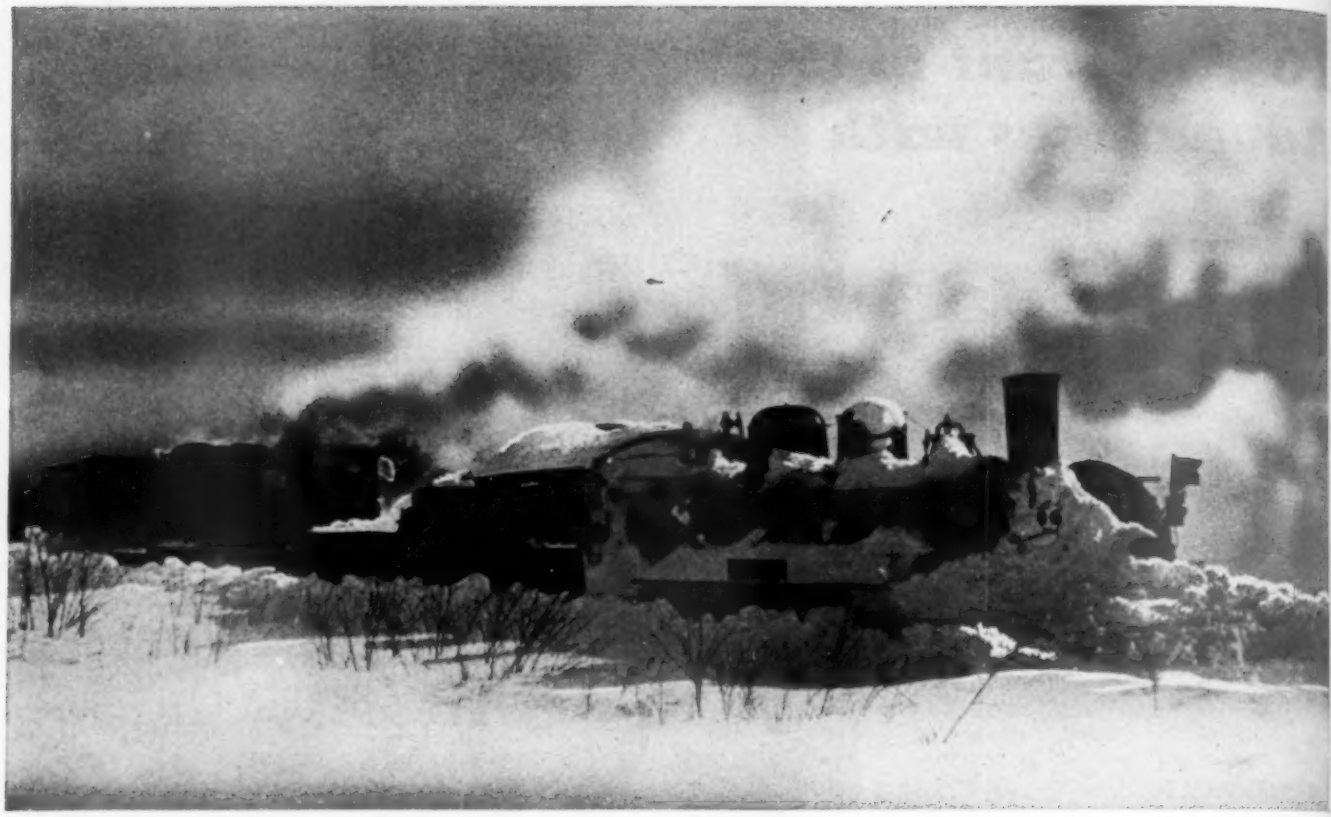
EASTERN CLAY PRODUCTS, INC., EIFORT, OHIO

ECP

DIXIE BOND • BLACK HILLS BENTONITE • REVIVO BOND • REVIVO SUPER BOND • BALANCED REVIVO

All TYPES OF BONDING CLAYS

A Foundry Sand Service Based Upon Practical Research



WINTER DELIVERY IS UNPREDICTABLE . . SO ORDER NOW!

It doesn't require a long memory to recall the tangled shipments of last winter; too many shippers and their customers retain vivid memories of stalled trains, blocked highways, snarled schedules. Avoid these delays in advance: place your orders with us NOW for the following SILICA SANDS: WASHED AND DRIED, STEEL MOLDING, ALUMINUM AND MAGNESIUM MOLDING, SYNTHETIC GRAY IRON AND MALLEABLE MOLDING; CORE, SAND-BLAST, FILTER, TRACTION, FURNACE BOTTOM AND BRICK SETTING. For steel, aluminum and magnesium molds and cores, as well as for openers and synthetic sands for gray iron and malleable foundries, we suggest *PORTAGE SANDS*. For dry sand castings, medium and heavy, we recommend *VENANGO SAND*. For steel, magnesium and aluminum molding, and cores for gray iron, malleable and aluminum, we suggest *GEAUGA SANDS*. For bottoms of acid open hearth and electric steel furnaces, there is no substitute for *COXEY FURNACE BOTTOM SANDS*. Order EARLY, and avoid traffic jams.

INDUSTRIAL SILICA Corp.

602 STAMBAUGH BLDG.

YOUNGSTOWN, O.

WE ARE IN THE HEART OF THE STEEL FOUNDRY INDUSTRY WHERE WE HAVE FREIGHT RATE ADVANTAGES

(*Continued from page* 168)

The broken, poorly defined grain of the casting shown in Fig. 20 is proved by the x-ray of Fig. 21 to be indicative of low density, whereas the larger, clearly defined, clean grain of Fig. 22 is indicative of sound metal. It is interesting that, due to rapid dissipation of heat by radiation, the grain structure in the upper part of the riser in Fig. 20 indicates the metal in this area to be sound with a porous region beneath.

The importance of studying the soundness of castings by x-raying thin slabs removed from critical areas cannot be emphasized too strongly. It is safe to say that an x-ray taken through the entire casting of Fig. 20 would not have shown too clearly the extent of the voids. X-ray pictures taken normal to the main plane of a defect do not show the defect in its more serious aspects. Measured under such conditions the actual magnitude of the defect may only equal about 3 per cent of the total thickness of the casting, an amount which approaches the lower limit of sensitivity of film. However, a thin section cut transversely across an unsound area presents a maximum percentage of defective metal for the x-ray to reveal and maximum sensitivity is obtained. It is true that in this sense radiography becomes a destructive rather than a nondestructive test and the technique could not be used for routine inspection. However, it can be used to great advantage as a research tool and as a means for critically inspecting pilot castings.

The casting of Fig. 26-A weighed 35 lb as cast and shows the solid tee-block casting of manganese bronze made sound by using the smallest possible riser without the aid of insulation. A smaller riser caused the secondary shrinkage to reach into the casting. Fig. 26-B shows the same casting made sound with an insulated riser of greatly reduced size. The casting weighed 21¾ lb.

In the various experiments no attempt was made to determine the effect of riser design upon the relative feeding efficiencies of uninsulated risers. Improvements in the design of uninsulated risers would also improve the behavior of insulated risers and this should be a subject for independent investigation. The straight sided riser is certainly not the optimum design.

(*To be concluded next issue*)

References

1. Briggs, C. W. and Gezelius, R. A., "Studies on Solidification and Contraction and Their Relation to the Formation of Hot Tears in Steel Castings," *Transactions*, American Foundrymen's Association, Vol. 41, pp. 385-448 (1933).
2. Batty, George, "Controlled Directional Solidification," *Transactions*, American Foundrymen's Association, Vol. 42, pp. 237-264 (1934).
3. Briggs, C. W. and Gezelius, R. A., "Studies on Solidification and Contraction in Steel Castings"—III, The Rate of Skin Formation," *Transactions*, American Foundrymen's Association, Vol. 43, pp. 274-302 (1935).
4. Duma, J. A. and Brinson, S. W., "Application of Controlled Directional Solidification to Large Steel Castings," *Transactions*, Ameri-

(*Concluded on page* 175)

TWO FAMOUS NAMES
POOL 134 YEARS OF EXPERIENCE

to offer you the only complete materials handling service in America

BECAUSE any belt conveyor system consists primarily of two main units—a BELT to carry the load, and a MECHANISM to move the belt—the engineering of these two vital units requires the closest kind of cooperation between equipment designer and belt manufacturer.

That is the kind of cooperation that produces the best results for *you*. Therefore, it is only natural that HEWITT, a name backed by 85 years in producing quality rubber products . . . and ROBINS, a name pre-eminent in the field of materials handling machinery for 49 years . . . should combine their 134 years of industrial experience. By combining their efforts . . . pooling their research . . . merging their resources and distribution facilities, they can offer you the *only complete job-engineered materials handling service in America.*

from HEWITT — quality rubber products for industry for 85 years. Precision-built, JOB - ENGINEERED conveyor *belts* for half a century.

from ROBINS — the finest quality JOB - ENGINEERED materials handling *machinery* for 49 years.

now—from HEWITT and ROBINS the only complete JOB - ENGINEERED *materials handling service in America.*

HEWITT RUBBER *of Buffalo*

HEWITT RUBBER CORPORATION
Buffalo, N. Y.

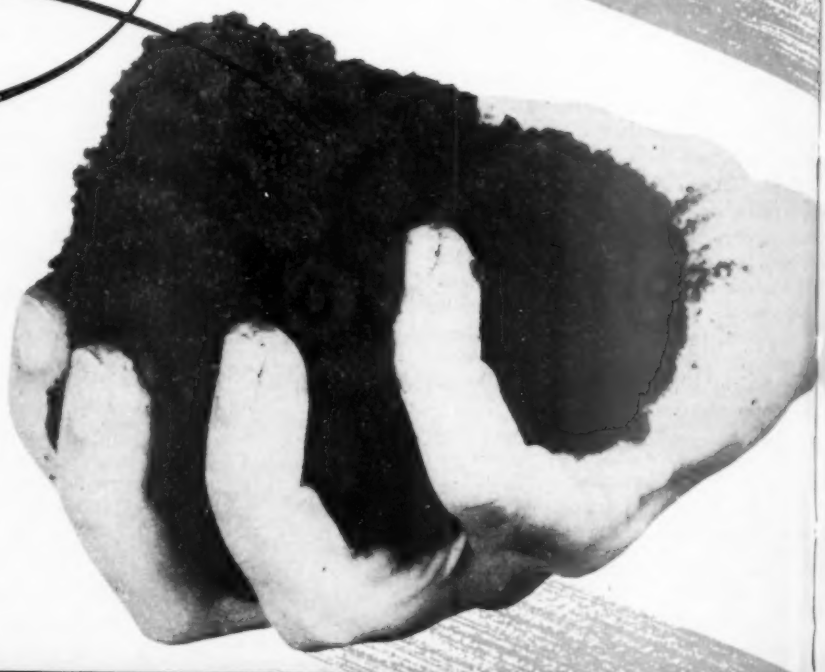
ROBINS CONVEYORS INCORPORATED
Passaic, N. J.

TIME IT!

Here is *speed* . . . 4½ times faster than any other mulling method! Time Speedmullor with a stop-watch! Time it as it plows, tosses, tumbles and agitates the sand as rubber-tired wheels squeeze the sand against rubber-lined walls.

TEST IT!

Now pick up a handful of Speedmullor-processed sand! Compare it with sand mixed by other methods—SEE and FEEL the difference! Note the thorough distribution, the fluffiness, the absence of lumps and sand masses. Every time, every batch, the Speedmullor mulls sand that will pass the most exacting tests.

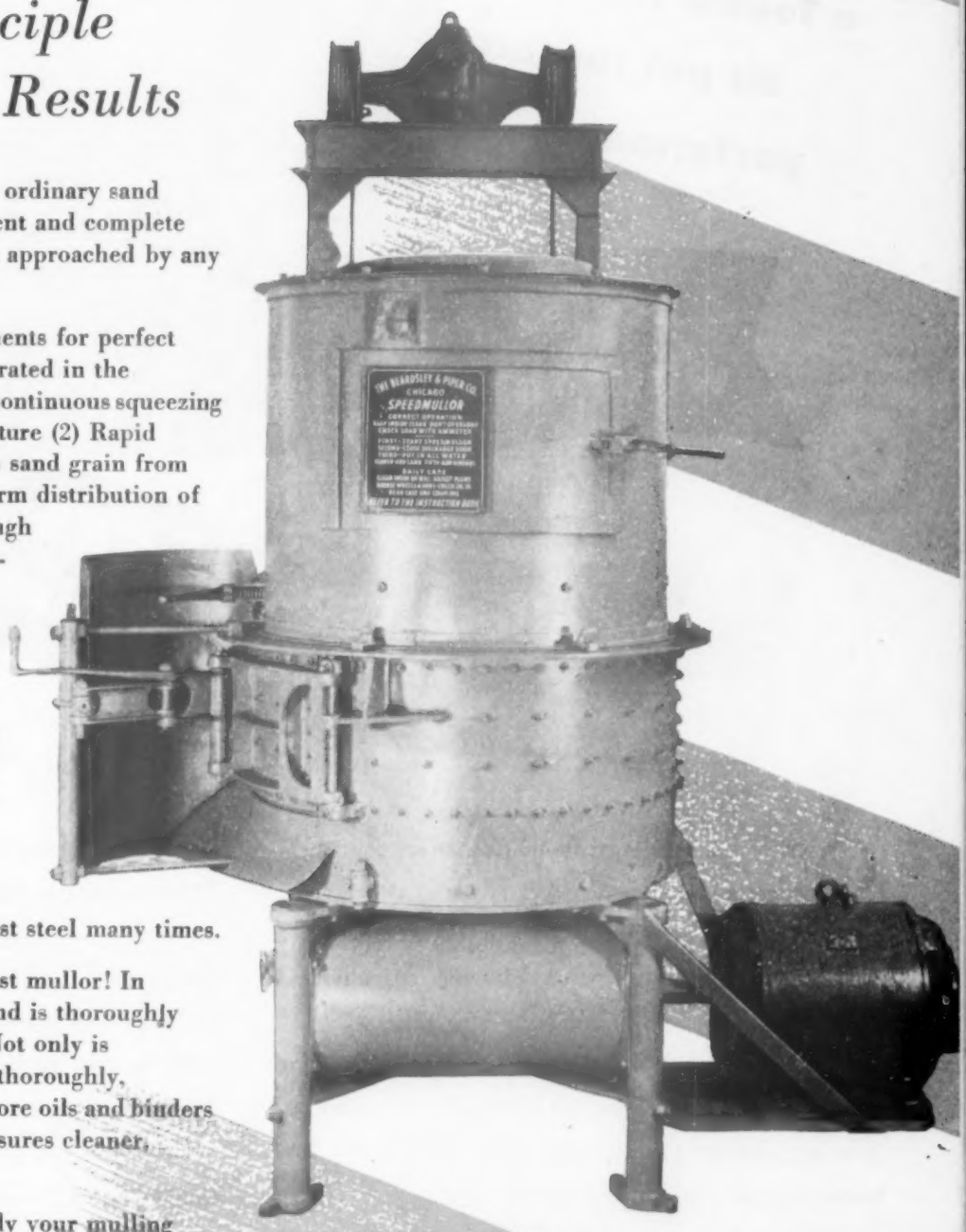


THE BEARDSLEY & PIPER COMPANY

2540 North Keeler Avenue • Chicago 39, Illinois

THE Speedmullor

New In Principle
Amazing In Results



The Speedmullor is NOT an ordinary sand mixer! It is an utterly different and complete method of mulling sand, not approached by any other type of unit.

All of the essential requirements for perfect and fast mulling are incorporated in the Speedmullor: (1) Pressure—continuous squeezing without damaging sand structure (2) Rapid Agitation—separation of one sand grain from another (3) Blending—uniform distribution of bonding elements (4) Thorough aeration and fluffing. In addition, where desired, the Speedmullor may be had with air cooling and fines removal.

The Speedmullor is the only machine that mulls between two pieces of live rubber —a rubber-lined wall and rubber tired wheels— surfaces that do not crush or grind—surfaces that outlast steel many times.

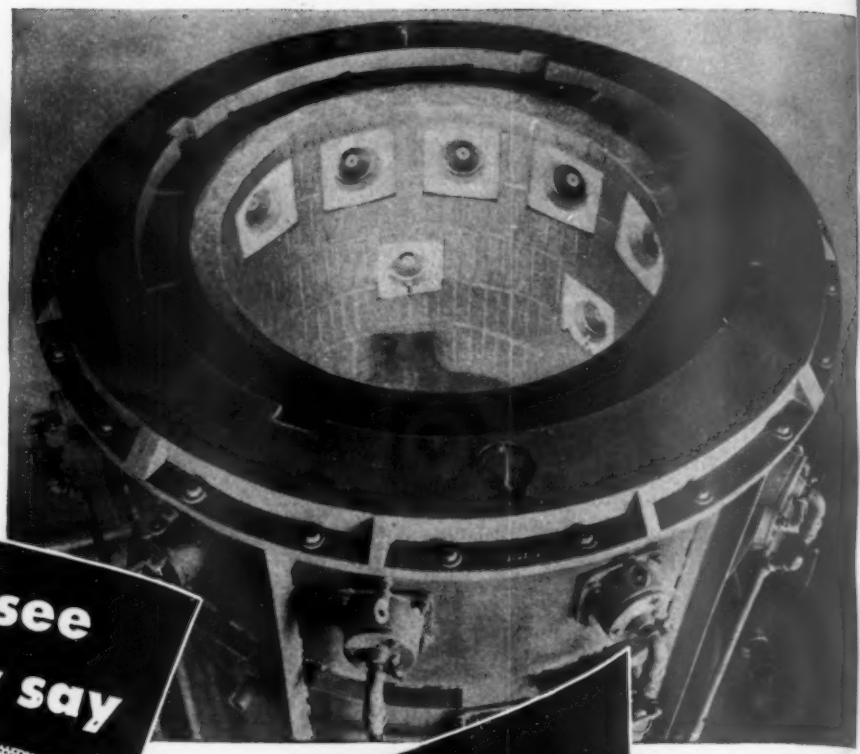
The Speedmullor is the fastest mullor! In some instances a batch of sand is thoroughly mulled in only 30 seconds. Not only is it faster, but it mulls more thoroughly, resulting in large savings in core oils and binders . . . produces a mix which insures cleaner, smoother castings.

Let the B & P engineers study your mulling problems and make recommendations without obligation to you. Write today.

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

THE BEARDSLEY & PIPER COMPANY ARE MANUFACTURERS OF SANDSLINGERS, SPEEDSLINGERS, SPEEDMULLORS, SCREENARATORS, MULBAROS, SHAKE-OUTS, SAND CONDITIONING MACHINES, GYRATORY SCREENS

You can't fool a foundryman on pot furnace performance



So let's see what they say about modern GAS foundry equipment

ONE of the achievements of recent Gas equipment progress has been the development of the ceramic, radiant Gas-fired burner and its application, with specific modifications for each type of operation, to individual industries.

In the foundry pot furnace, these burners, completing combustion entirely inside the cup with no torching or blasting, deliver a uniform flow of heat to the job, eliminating uneven heating and hot spots.

The proof is in the performance and the testimony of the men on the job. Here are a few statements:

"Average magnesium pot life increased 5 times" . . . "27% savings in fuel" . . . *"8570 production hours, and 30 million pounds of work, without a hitch"* . . . *"½ as much dross"* . . . "less than half as many Btu required per pound of metal melted" . . . "pot now uniform at 1700°F, used to have spots as hot as 2400°F." . . . "shop likes job, controllability good, maintenance nil."

The benefits to your industry from advances in Gas equipment are localized through the Industrial Engineer of your own Gas Company, who is available for consultation.

AMERICAN GAS ASSOCIATION

INDUSTRIAL AND COMMERCIAL GAS SECTION

420 LEXINGTON AVENUE, NEW YORK, 17, N.Y.

THE TREND IS TO GAS

FOR ALL INDUSTRIAL HEATING

(*Concluded from page* 171)

can Foundrymen's Association, Vol. 48, pp. 225-282 (1940).

5. Taylor, H. F. and Rominski, E. A., "Atmospheric Pressure and the Steel Casting—A New Technique in Gating and Risering," *Transactions*, American Foundrymen's Association, Vol. 50, pp. 215-259, (1942).

6. Taylor, H. F., Rominski, E. A. and Briggs, C. W., "The Fluidity of Ingot Iron and Carbon and Alloy Cast Steels," *Transactions*, American Foundrymen's Association, Vol. 49, pp. 1-93 (1941).

SMALL BRASS FOUNDRY HAS GOOD PRODUCTION

(*Continued from page* 105)

80 graphite crucible holding approximately 240 lb, and melting time is from 45 to 50 minutes. Aluminum is melted in a stationary oil-fired furnace holding a graphite crucible with a capacity of 350 lb. Bronze melting furnaces are located beneath a large hood opening into a 36-in. diameter stack extending through the roof of the building which effectively removes all heat and fumes from melting operations.

Molten metal is transported from the furnaces on tramrail cranes of which there are two, one in each foundry bay. Near the furnaces a short length of rail centrally pivoted and supported is located so that the crucible and its trolley can be shifted from the crane in one bay to that in the other. A crucible carrying device, as depicted in Fig. 2, constitutes a pouring mechanism. It is equipped with a rack and pinion operated by a handwheel which permits the crucible to be raised and lowered to various heights so that its lip is close to the sprue opening. Use of the tramrail cranes for transportation of crucibles permits rapid movement of molten metal from the furnace to any desired point on the molding floors with little fatigue on the operator's part, and without spilling any metal.

Molds Poured on Skids

Molds are made on five jolt-squeeze molding machines and on four benches, as well as on the floor in the case of large molds. Molds in many cases are set off on steel pouring skids as shown in Fig. 3. The skids or racks are constructed of angle irons and are about 12 in. high and 12 ft long. As may be imagined, use of the racks eliminates the backbreaking stoop involved in placing molds on the floor, and likewise when picking up the molds for shaking out.

Castings are shaken out on the floor near the molders' benches or machines, and after the sand is tempered it is reconditioned by screening through a gyratory riddle. That procedure not only blends, cools and aerates the sand, but also removes any lumps and pieces of metal resulting from spills, etc. After the castings are shaken out they are taken to the cleaning room for removal of gates and risers. Method for per-

MULBARO Cuts

SAND PREPARATION TIME 50%

"A 50% cut in our core sand preparation time with the Mulbaro! That's a real saving!" say officials of the Milwaukee Flush Valve Company, Milwaukee, Wisc. "What's more, the Mulbaro has paid for itself in oil savings alone in less than a year, due to more thorough, more uniform sand mulling which meets our exact molding requirements." Foundries, large and small, use the Mulbaro for facing and backing as well as core sand.

How the Mulbaro works: Sand is shoveled into barrow. Filled barrow is then wheeled into position under the mulling unit.

Mulling unit is lowered onto barrow with a hoist. Required amount of oil is added and within a few minutes, sand is completely mulled.

Mulled sand is now moved away to molding machines; another barrow of sand is placed under mulling unit.

ONLY $895*

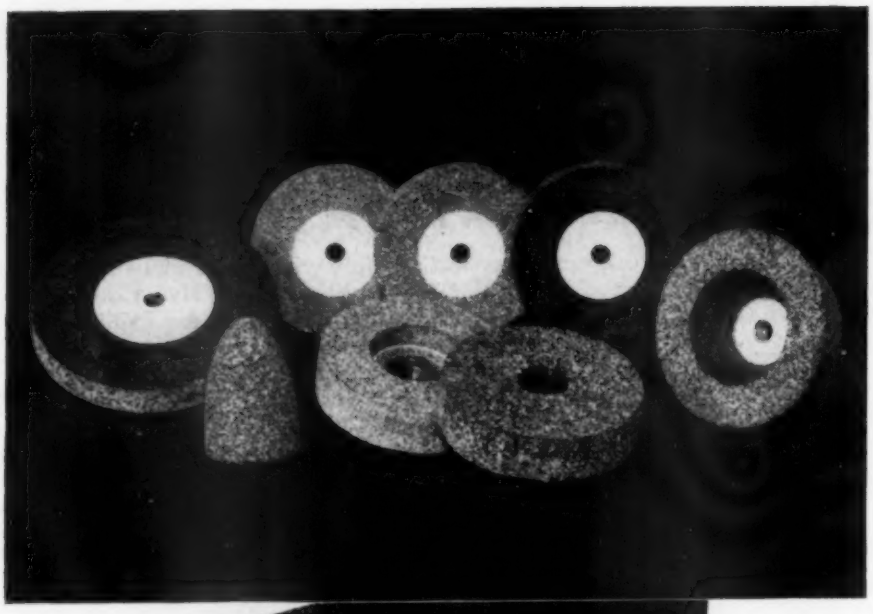
*Entire Mulbaro unit costs only $895.00 F.O.B. Chicago . . . additional barrows are $95.00 each.

Get complete engineering data and specifications on this amazing mullor . . . write today!

THE BEARDSLEY & PIPER CO.

2540 North Keeler Avenue Chicago 39, Illinois

Manufacturers of Speedslingers, Speedmullors, Sandslingers, Screenarators, Mulbaros, Shake-Outs, Sand Conditioning Machines



The Foundryman wants

Rapid Stock Removal with Long Wheel Life

Cortland has exactly the right wheels for your snagging . . . and Cortland Engineers are ready to work with you to see that you get fast, cool cutting with adequate wheel life.

All types — all sizes for swing frame, floor stand and portable machines, in standard and special combinations of abrasive, grain, grade bond and structure.

Please feel free to ask our advice about your snagging problems.

CORTLAND GRINDING WHEELS CORP.
6 Cortland Street
Chester Mass.

For Better Snagging

CORTLAND

forming that operation will depend upon the size and accessibility of gates and risers in relation to the casting. Equipment includes a sprue cutter, abrasive cut-off wheel, band saw and pneumatic chisels.

Following the removal of gates and risers the castings are snagged or ground on stand grinding machines or with wheels mounted on flexible shafts in order to cut down the gate stubs to the contour of the casting and to smooth down any rough spots or joint fins.

Light and medium brass and bronze castings then are placed in a small water tumbling mill and rotated for several hours to obtain a burnished finish. Burnishing medium consists of metal spills, pot skimmings, floor sweepings, etc., which performs two functions. One is the desired action of polishing or burnishing, and the other is washing out the sand and dirt from those materials, leaving clean metallics for remelting or for sale to smelters. Some of the aluminum and the larger brass and bronze castings are abrasive blasted to obtain desired finishes.

Use Ingenious Type Pattern

Fig. 4 shows an ingenious method for producing bronze castings for a milking machine part, the process eliminating use of ram-up cores, drawbacks, etc., to form a projection. As may be observed from the gate of castings at the left and the matchplate at the right of the illustration, the ringshape body contains four projections or teats extending from one end at approximately 45° in one direction, and a fifth at the other end of the body extends at about the same angle in the opposite direction. As might be expected, it is a comparatively easy matter to lay out the pattern for producing one set of projections or the other, but not both. Method is to arrange an irregular parting line with a split along the horizontal center line of the projection or teat, and that was followed with the four on one end of the body.

The cavity for forming the remaining projection on the other end of the body is formed by loose piece inserted through a hole drilled at the proper angle and position in the body. Loose piece is formed of brass with a head which fits into a recess in the top of the pattern. Four patterns compose a gate, as may be seen in Fig. 4, and molds are produced on a jolt squeeze machine. Drag mold is made by jolting, using a follow board of the proper contour beneath the matchplate not only as a support but also to hold the loose pieces in place. After the drag mold is made, mold, matchplate and followboard are rolled over. Followboard is removed and the cope made by a squeezing operation. Cope is removed and set aside. Then loose pieces are drawn from the matchplate, and the matchplate lifted from the drag mold. After punching a sprue hole through the cope and setting four small cores in the drag to form the body openings the operator closes the mold and places it on the skid.

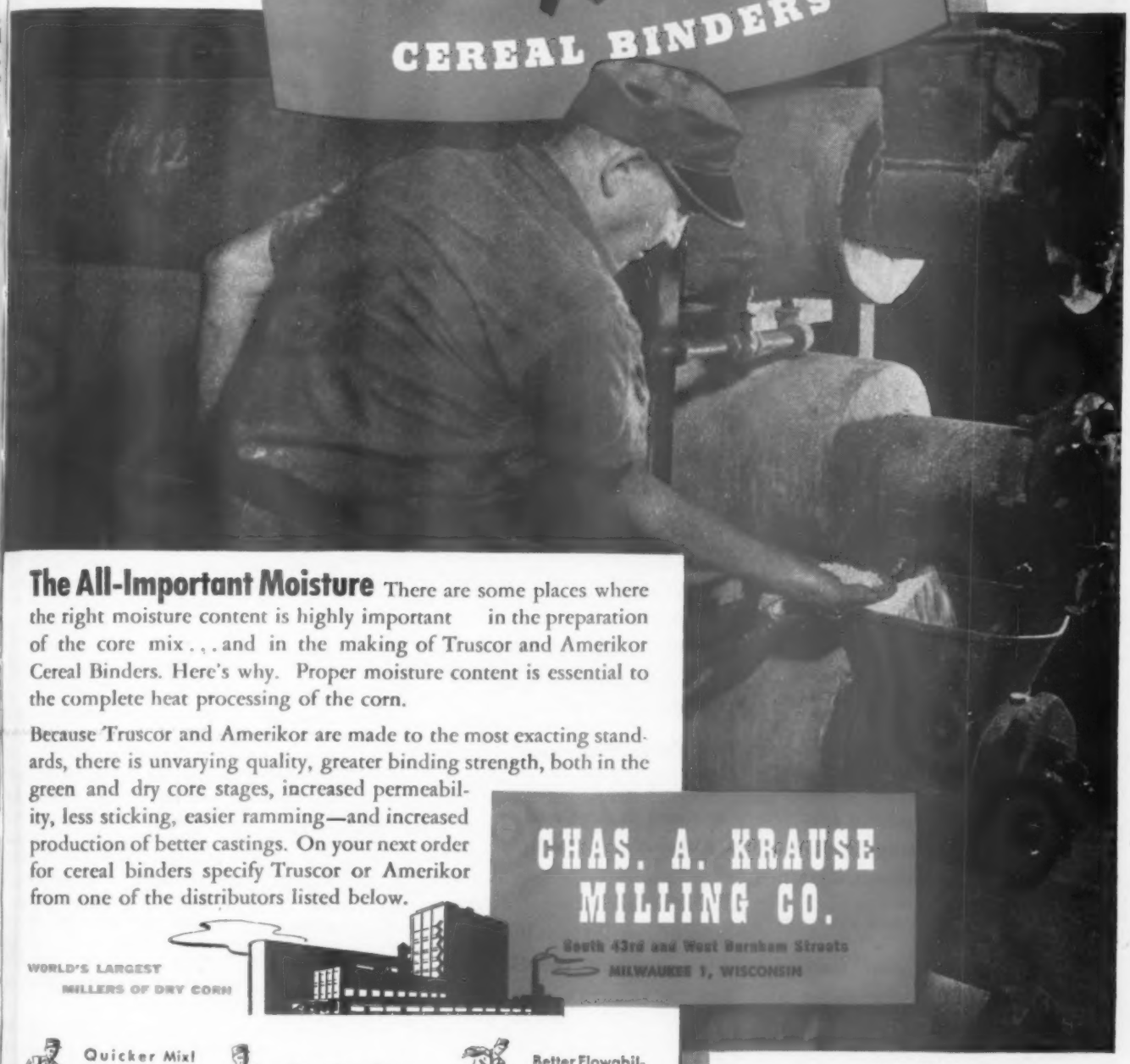
(*Concluded on page* 178)

KRAUSE

Truscor (Light Weight) AND Amerikor (Heavy Weight)

CEREAL BINDERS

A series of tempering stands like these give the dry corn the right moisture content for complete gelatinization—greater binding properties.



The All-Important Moisture There are some places where the right moisture content is highly important in the preparation of the core mix . . . and in the making of Truscor and Amerikor Cereal Binders. Here's why. Proper moisture content is essential to the complete heat processing of the corn.

Because Truscor and Amerikor are made to the most exacting standards, there is unvarying quality, greater binding strength, both in the green and dry core stages, increased permeability, less sticking, easier ramming—and increased production of better castings. On your next order for cereal binders specify Truscor or Amerikor from one of the distributors listed below.

CHAS. A. KRAUSE MILLING CO.

South 43rd and West Burnham Streets
MILWAUKEE 1, WISCONSIN

WORLD'S LARGEST MILLERS OF DRY CORN

Quicker Mix! Blends with All Binders!

Greater Green Strength! No Sag!

Better Flowability! Uniform Ramming!

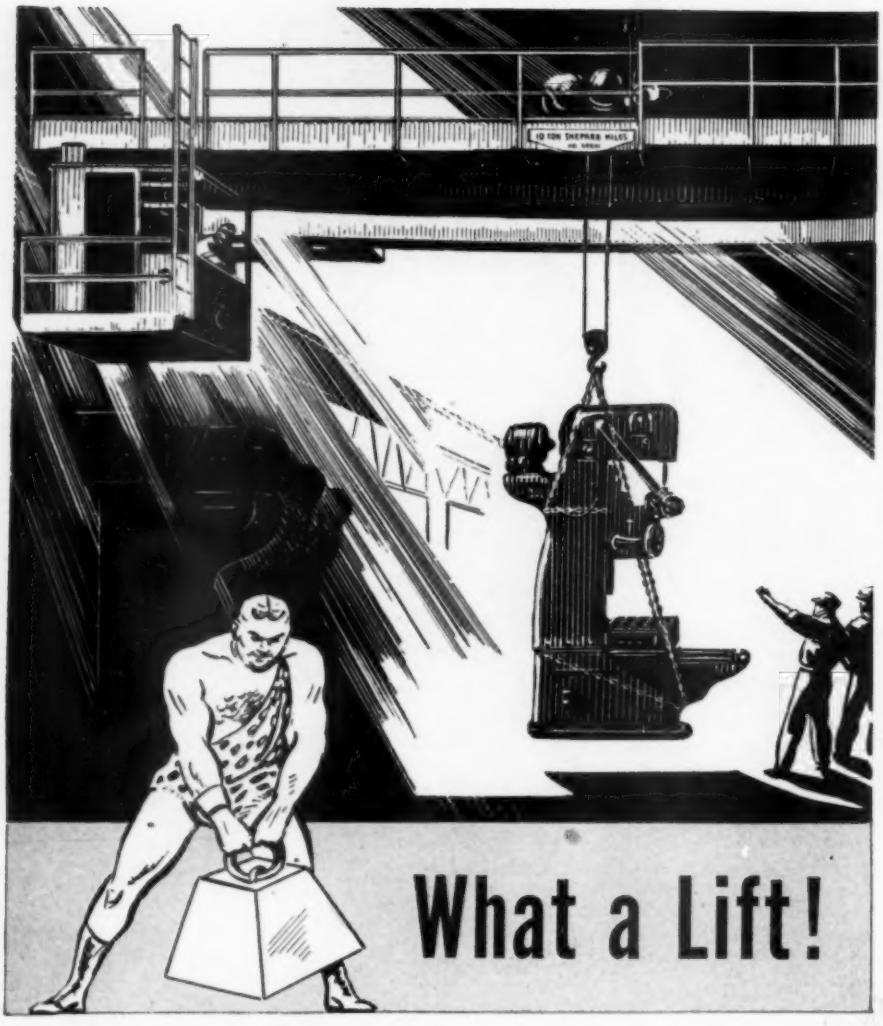
No Sticking! Increased Production!

Quicker Shake-Out—Saves Time!

Better Permeability! Less Scabbing, Cold Shut, Buckling!

DISTRIBUTORS

M. A. Bell Co., St. Louis 2, Mo.
A. L. Cavedo & Son, Inc., Richmond 21, Va.
Foundry Supplies Co., Chicago 16, Ill.
J. H. Halten, Lansdowne, Pa.
Independent Foundry Supply Co., Los Angeles 11, Calif.
Matthens & Co., Moline, Ill.
Carl F. Miller & Co., Seattle 4, Wash.
Miller & Zehrung Chemical Co., Portland 9, Oregon
Milwaukee Chaplet & Mfg. Co., Milwaukee 4, Wis.
Pacific Graphite Works, Oakland 8, Calif.
Porter-Warner, Chattanooga 2, Tenn.
Smith-Sharpe Co., Minneapolis 14, Minn.
Frederic B. Stevens, Inc., Buffalo 12, N. Y.
Frederic B. Stevens, Inc., Cleveland 14, Ohio
Frederic B. Stevens, Inc., Detroit 26, Mich.



Powerful and rugged enough to lift a tank, a locomotive, a battleship turret or any piece of machinery weighing up to 450 tons, the Shepard Niles riveted box girder crane is yet so delicately controlled that it will handle all kinds of loads in a smooth and accurate manner.

- Crane compactly built, requiring minimum clearances.
- Mechanism completely encased in dust and moisture-proof housings. Automatic oil bath. Permanent alignment.

A crane to suit every need!

To solve your loading problem, consult the Shepard Niles representative in your locality or write directly to home office.

Shepard Niles
CRANE & HOIST CORPORATION

360 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

(*Concluded from page 176*)

Castings are gated into the sides of the bodies with knife gates about 3/16 in. wide and 2 in. high which extend somewhat below the body against the core print. Extension of the gate below the mold cavity permits the metal to enter the cavity gently from the bottom at first, and building up as the height of metal increases in the blind riser to which the gate is attached. As may be seen in Fig. 4, two blind risers are employed and two castings are fed from each. The two risers are joined by a short square runner which continues to one side of the mold where it meets the pouring sprue.

Standard Brass Works produces many small brass and bronze disks with and without stems. They are about 2 in. in diameter, 3/8-in. thick and in case of stems the latter are about 3/8-in. in diameter and ½-in high. These are made in gates of 12, six on the side of a central runner. Disks with stems are made with the stems down. Central runner is about 5/8-in. wide and 3/8-in. high, and the pouring sprue is about 1½ in. in diameter. The firm also makes bushings of various diameters, and while the number in a flask will vary with size and weight, gating principles followed are the same.

Promote Directional Solidification

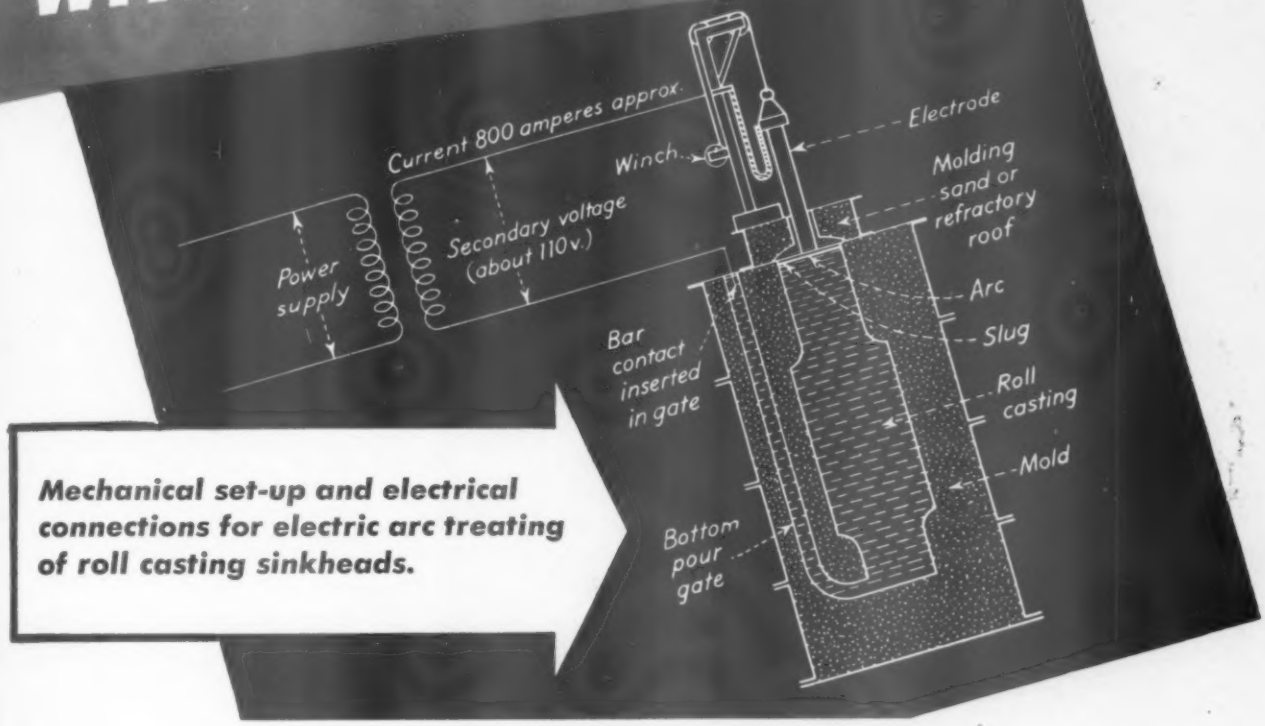
Castings are molded and poured in a horizontal position, and the gating method is to use a sprue at one end of the mold which is connected by a runner to a riser at the other end. The riser is close to the mold cavity and connected thereto with a short gate. This gating procedure has given good results, since it places the hottest metal where it is needed the most—in the feeding riser—and promotes directional solidification due to the fact that the coldest metal is farthest from the gate.

For example, bushings about 14 in. long and 3 in. outside diameter with a wall thickness of ½-in. are molded two in a flask on a jolt-squeeze machine. A pouring sprue about 1½-in. in diameter is located at one end of the pattern and is connected to the 2 in. diameter riser close to the other end by a runner. The runner is located centrally between the half patterns and is about 3/4-in. wide and ½-in. high. The riser is placed about 3/4-in. beyond the ends of the patterns, and gates about ½-in. wide and 2 in. high, half in the cope and half in the drag, connect the riser with the casting along the core print.

In the case of a heavier bushing with a 1-in. wall made singly in a flask, the sprue, runner and riser are on one side. The pouring sprue is not quite near the one end of the casting, but the riser, as in the previous description, is located just beyond the end of the casting. As might be expected, the gate is thicker and a little higher to insure a good flow of metal, and also to prevent freezing off before feeding is complete. The gate is about 1-in. wide and 3 in. high, split half in the cope and half in the drag.

No. 11 of a Series: "Looking at the FIVE ESSENTIAL things you never see in ELECTRODES."

TOP CROP CUT TO 5% WITH ELECTRIC ARC HOT TOPPING



Mechanical set-up and electrical connections for electric arc treating of roll casting sinkheads.

SEVERAL years ago National Carbon Company began a series of experiments with electric arc heating of steel ingot hot tops and the sinkheads of large steel castings. The results of these experiments have been confirmed in commercial practice by several steel plants, which report the process offers economy and an increase in production without upping producing capacity.

One stainless steel plant, where operating practice was exceptionally good, normally obtained a top crop of 8½%. Electric arc hot topping reduced the crop to 5% ... at a saving of several dollars per ton over the cost of the hot topping operations.

At another plant producing large roll castings, 694 tons of metal were treated. Castings averaged 27.8 tons. Total saving was 111.4 tons, an average of 4.5 tons per casting. The cost: less than $1 per ton of metal treated.

Hot topping apparatus is inexpensive. Electrode consumption is only one-half pound per ton of metal treated.

Our experimental work with hot topping is part of what we call "customer service"—one of the five essential things you never see in "National" carbon and "Acheson" graphite electrodes. The others: selection of raw materials, manufacturing experience, manufacturing control, and continuing research. We invite you to write our nearest office about these reasons for the superior performance of "National" and "Acheson" electrodes.

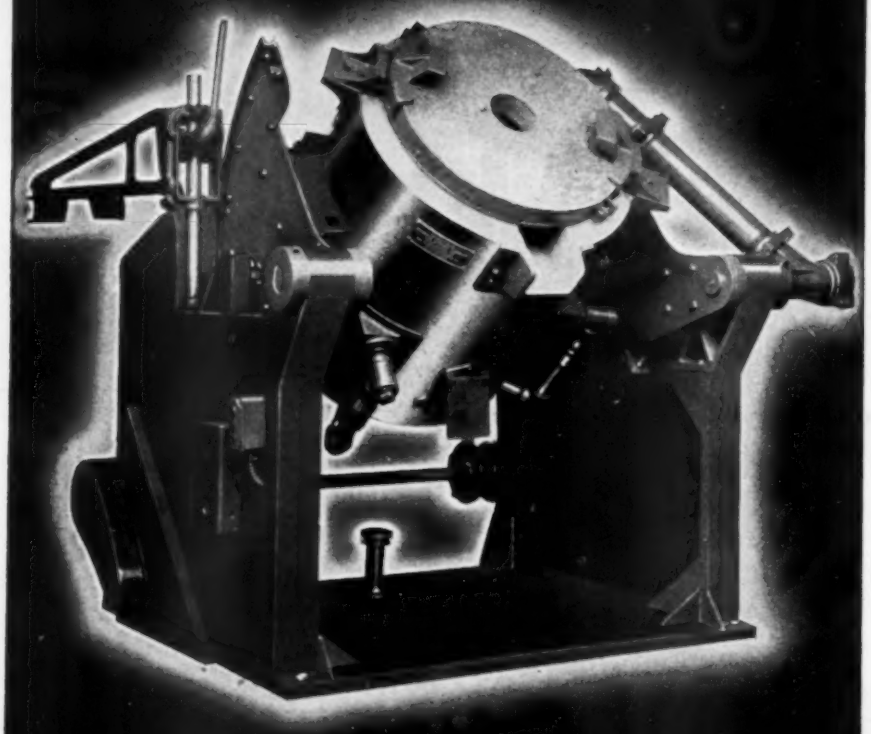
NATIONAL CARBON

ACHESON GRAPHITE

The words "National" and "Acheson" and the "National" and "Acheson" Seals are registered trade-marks of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.
Unit of Union Carbide and Carbon Corporation
UCC
GENERAL OFFICES: 30 East 42nd Street, New York 17, N.Y.
DIVISION SALES OFFICES: Atlanta, Chicago, Dallas, Kansas City, New York, Pittsburgh, San Francisco
In Canada: Canadian National Carbon Company Limited, Toronto 4, Canada

HAUSFELD
NOSE-TILT FURNACES



THE EFFICIENT WAY
TO MELT BRASS
AND OTHER
NON-FERROUS ALLOYS

Crucible Sizes from 225 to 400 . . . Iron and Steel Pot Capacities up to 2000 lbs.

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

NAVY YARD FOUNDRY MEETS PEAK DEMANDS

(*Continued from page* 109)

through reconditioning equipment and delivered onto a belt which travels over all the small hoppers or chutes over the line of molding machines. Adjustable plows direct the sand supply as required in each hopper.

Castings are loaded on skids and trucked a short distance to where operators and equipment are stationed to chip and clean them and remove the gates and risers. General movement of all castings is in the direction of the east end of the building from where all castings are shipped.

This applies to the iron and steel castings as well as the nonferrous castings. Large ferrous castings are treated in a chamber where abrasive material is shot through a hose in the hands of an operator. Smaller castings are loaded on a turntable where they are subjected to the same treatment, in this instance applied automatically and mechanically. As a result of care in the selection and preparation of the sand, and the further practice of air drying the molds, the pressure blasting operation is reduced to a minimum.

Develop Sand Mixtures

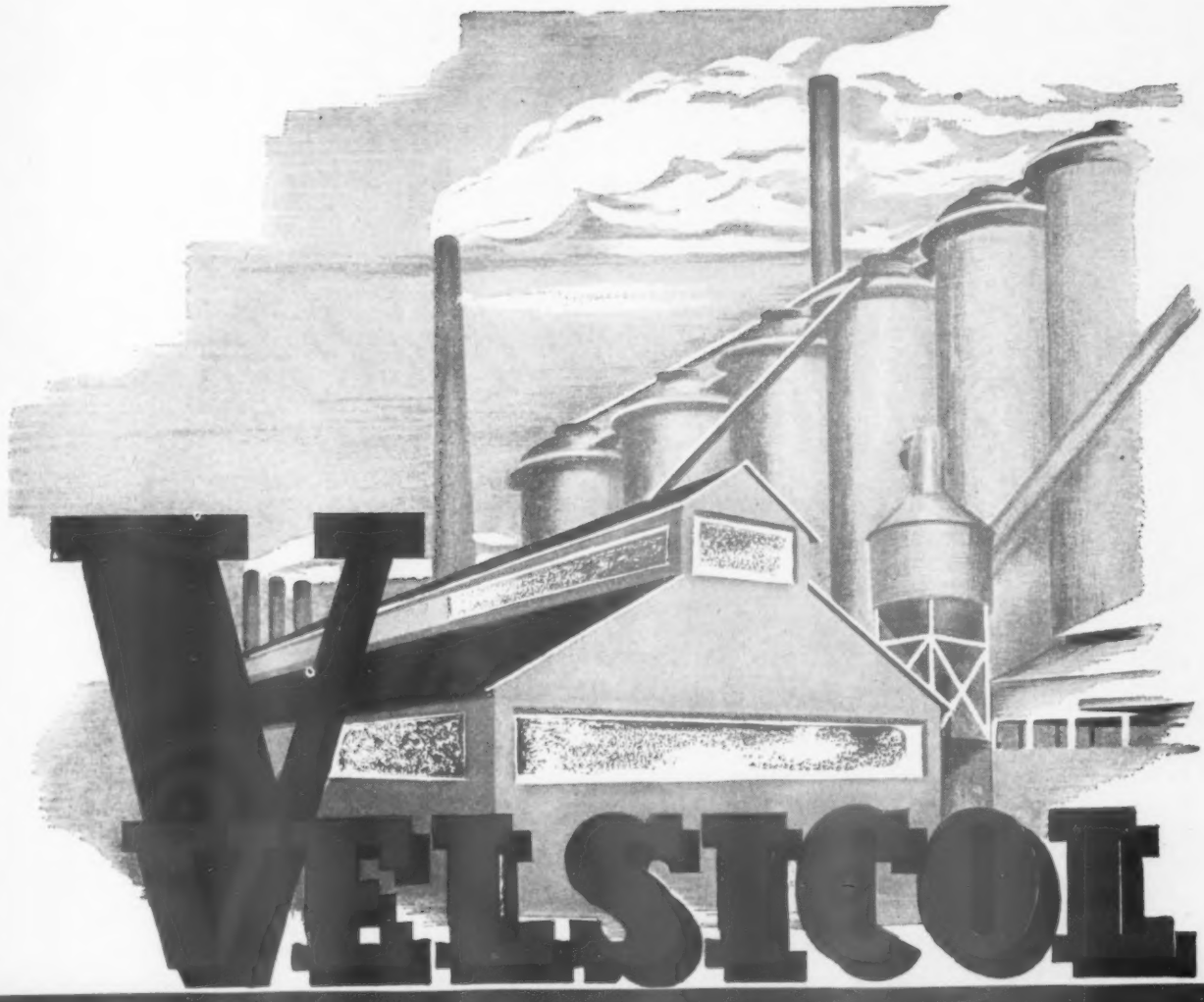
Green sand facing for steel castings is prepared from the following mixture: Silica sand, 50 to 60 mesh, 500 lb; western bentonite 20 lb; cereal binder 5 lb; water 3 to 4 per cent. The sand and binders are mulled dry for 5 minutes. Then the water is added and mulling is continued for an additional 10 minutes. Floor sand may be riddled and used to replace new silica sand in proportions up to 50 per cent. This facing with a green sand strength of about 5 lb is suitable for the majority of small and medium weight castings. A suitable backing sand contains heap sand 500 lb, bentonite 8 lb, water 2.5 to 4.00 per cent.

Dry sand facing for heavy section steel castings contains silica sand 750 lb; silica flour 250 lb; bentonite 60 lb; water soluble binder 6 quarts; water 6 to 7 per cent. For light metal sections the mixture is modified to silica sand 400 pounds; silica flour 100 pounds; bentonite 20 pounds; water soluble binder 3 qt; water 6 to 7 per cent.

Core sand mixture for light metal sections contains silica sand 375 lb; core oil 4.5 qt; silica flour 25 lb; bentonite 8 lb; cereal binder 6 lb. For small cores in average metal sections the mixture contains silica sand 500 lb; silica flour 100 lb; core oil 5 qt, bentonite 8 lb. Cores surrounded by heavy metal sections are made from a mixture containing 45 shovels silica sand; 50 shovels silica flour; 7 qt bentonite and 21 qt core oil.

Facing sand for iron castings is made

(*Continued on page* 184)



Coresin Oils

No flaws lost in the foundry, no costly schedule upsets because of varying quality when you use VELSICOL CORESIN OILS. The result of years of research and manufacturing experience, the CORESIN content of these oils insures constant uniformity from test tub to tank car ... assures production of smoother, more accurate castings because CORESIN OILS contain all essential properties needed to make perfect cores.

Our laboratory and engineering service are at your disposal. We urge you to use this coupon today to obtain a working sample of Velsicol CORESIN OIL to meet your specific requirements.

Please send at once free sample of Velsicol Coresin Oil.
We pour ☐ ferrous ☐ non-ferrous metals.

VELSICOL Corporation

GENERAL OFFICES: 120 EAST PEARSON STREET, CHICAGO 11, ILLINOIS

The Foundries Materials Company, Coldwater and Detroit, Michigan, and Hammond, Indiana; Midwest Foundry Supply Company, Edwardsville, Illinois; H. S. Stoller & Company, Akron, Ohio.

Coming from Peninsular...

Important Developments

for peacetime grinding needs

AS INDUSTRY turns from war production to the battle of peacetime competition—one thing is certain!

Profit margins will be determined, in no small measure, by the ability of individual manufacturers to take full advantage of the newest and most efficient manufacturing tools and processes available.

When it comes to grinding, Peninsular stands ready to help you meet this challenge.

Long recognized as pioneers in the field of abrasives, Peninsular engineers widely expanded their field and research work during the closing months of the war. Out of this effort have come important developments in the fabrication of abrasive wheels—in methods for their manufacture—in means for their application to the problems of tomorrow.

These developments, applied to your specific problems, will help you reduce your grinding costs and increase your postwar profit opportunity.

A STANDING INVITATION

Our expert staff of factory and field engineers are ready today to help in your reconversion program—with a production, engineering and cost analysis service beyond any offered up to now in the industry.

The Peninsular Grinding Wheel Company, 729 Meldrum Ave., Detroit 7. *Sales Offices:* Chicago, Philadelphia, Cleveland, Newark, Pittsburgh.

SPECIALISTS IN RESINOID BONDED WHEELS

PENINSULAR

SINCE 1889

Two different types of cup grinding wheels

INDIVIDUALLY PENINSULAR ENGINEERED
GRINDING WHEELS

NEW and UNIQUE! » THE CARTRIDGE BENCH CORE BLOWER

*Users report remarkable increases in quality and quantity of production

Produces variety of intricate cores with unusual speed and simplicity.

Comes ready to use—virtually no installation cost.

Can be operated with unskilled labor—extremely easy to use.

If you make cores 2 lbs. or under—this unit ideally suited to your use.

Designed by two practical foundrymen.

WRITE for complete details and new booklet

Core boxes can be made very light, in most instances bench equipment now used can be converted for blowing. Almost any sand now commonly used on the core bench may be used for blowing cores. Adjustment for boxes of different height, size and shape made instantly.

To operate, core box and cartridge are held down by pressure handle while left hand operates blow valve. After core has been blown, the box is pulled forward and cartridge is lifted off and the work of drawing core is completed on base of machine.

FILLS NEED FOR SIMPLE, FLEXIBLE BLOWER

The New *Redford Cartridge Bench Blower* has met with enthusiastic acceptance by foundrymen because it supplies an important need in the foundry for an efficient, low-cost method of blowing small, intricate cores. It requires no large volume of air and readily lends itself to handling a variety of core boxes. In fact, they tell us that it is the ideal method of making cores in single or gang boxes requiring a maximum of 2 lbs. of sand.

SAND CARTRIDGES AVAILABLE IN 8 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in seven additional standard sizes and special sizes furnished where needed.

★ Cartridge Bench Core Blowers

Redford IRON & EQUIPMENT CO.

Phone: REdford 8610

21315 West McNicholls Rd. Detroit 19, Michigan

(*Continued from page* 180)

up of 60 parts old sand; 40 parts new sand; 1 to 4 parts bentonite depending on the required green sand strength; and 2 parts sea coal or pitch. Core sand for iron castings is made up in the proportion of 1 part bentonite and 1 qt core oil to 40 parts silica sand. Where the cores are to be surrounded by heavy metal sections the mixture contains 4 lb silica flour, 1 part bentonite and 1 qt core oil to 35 parts silica sand. Cores for either iron or steel castings are made from the same standard or base sand with proper addition of bentonite, cereal, core oil, molasses or other water soluble core binder, and water.

Silica wash for dry sand molds and cores contains silica flour 200 lb; water 35 gal; bentonite 4 qt; core oil 8 qt; molasses or other water soluble binder 3 qt. The oil is omitted where the wash is to be applied to green sand molds which are air dried before they are filled with metal.

Ladles are lined with a mixture of 2½ parts amorphous crushed silica and 1 part fire clay tempered to working consistency with water. Additional water is added where the material is used between and as a facing for fire bricks. A satisfactory lining material for hand shank ladles carrying high temperature metal—iron, steel or monel—contains 30 parts new sand, 30 parts old sand, 10 parts bentonite and water to temper to consistency of wet molding sand. The mixture is rammed in place. Ladle linings are thoroughly dried and raised to a red heat before the ladles are placed in use. They are cleaned and patched each day before they are placed in service.

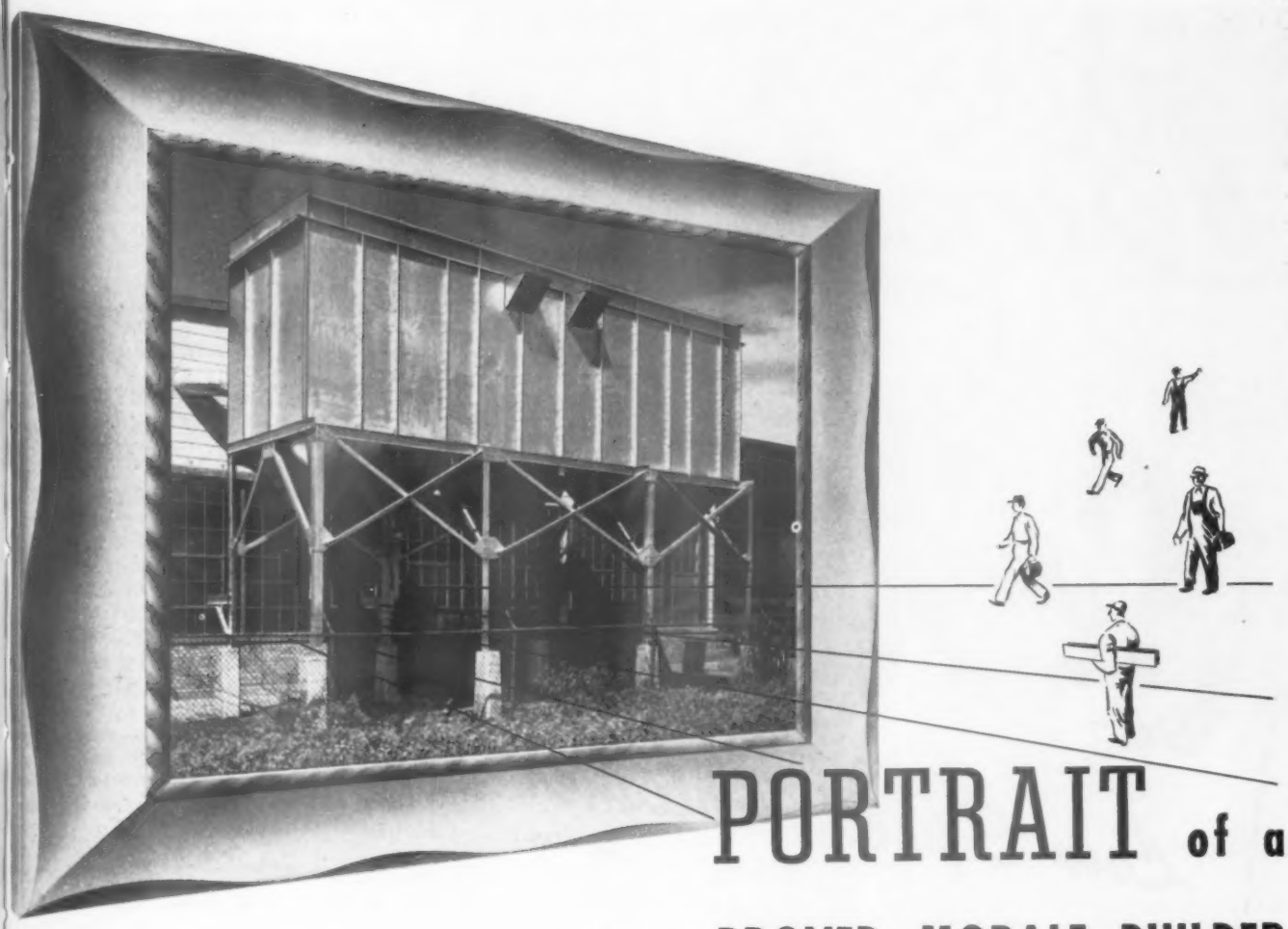
Sand Prepared Mechanically

Molds for iron and steel castings are shaken out on a powerful bumper grating near the east end of the main bay. The sand is carried by a belt and discharged over a magnetic pulley into an elaborate sand preparation plant set up in the adjoining north bay of the foundry. The sand is cooled, screened and mulled and discharged into large storage tanks or hoppers, from which it is distributed later by crane and bucket to anywhere it may be required on the molding floor. Tentative plans have been prepared for the installation of a belt delivery system in the near future. The entire system under the supervision of a skilled operator is controlled through a series of push buttons mounted in a long panel on the wall.

Exceptionally clean surface on the large steel hawse pipe casting shown in one of the accompanying illustrations indicates the satisfactory condition of the sand in the mold which was air dried for a period of 24 hr before it was closed and filled with metal. The photograph was taken just after the casting was shaken out and before it had passed through the pressure blasting chamber.

In addition to the economic feature of no cost—up to the present no person or bureau has established a monopoly, a

(*Continued on page* 186)



PORTRAIT of a

PROVED MORALE BUILDER for your Employee Relations Program

SEEMS strange, doesn't it, to have a portrait made of a Dust Collector? Usually portraits are reserved for animated, human subjects.

True . . . but an American Dustube is in much the same category. It touches the working-lives of people in a friendly, protective, human sort of way. It is one of the best morale builders you can have in your plant. It is an emblem of good will.

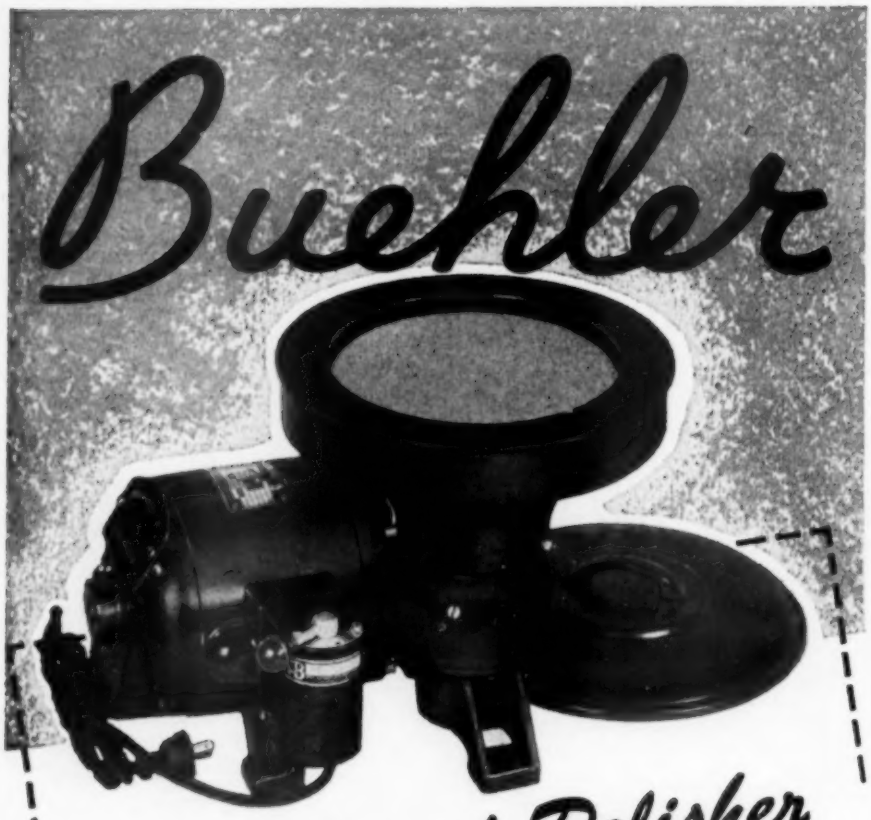
No one likes to work where dust is obnoxious. And where such conditions are permitted to exist production efficiency is bound to sag.

With a Dustube working for you, good will and production can be kept at the peak. It combines all three characteristics of a good dust collector: high efficiency; simplicity of installation, operation and inspection; low operating and maintenance costs. Supplied in three types, it handles air volumes from 270 C.F.M. up.

Get more information about Dustubes today. Write for Catalog No. 72, a completely new and revised edition listing full data on American Dust Collecting equipment.

American
FOUNDRY EQUIPMENT CO.
508 SOUTH BYRKIT ST. MISHAWAKA, IND.

dustube
DUST COLLECTORS



Low Speed Polisher

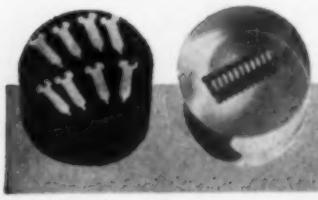
No. 1505-2

. . . for accurate final polishing

Low speed polishing is increasingly popular for the final step, particularly where soft non-ferrous metals are encountered. The production of smooth polished samples with a minimum of surface scratches and disturbed metal is the outstanding feature of this low speed Buehler Polisher No. 1505-2. Built to operate at selective speeds of 150 r.p.m. and 250 r.p.m. through a positive gear head drive housed in an oiltight base, this polisher represents the highest development in equipment for precision finishing of specimens. This polisher is also perfectly suited to the wax lap or lead lap polishing technique preferred by many metallurgists.

The 8" diameter polishing disc is attached to a countershaft by a tapered sleeve. This tapered fit and long span between bearings assures smooth operation. The motor is ¼ h.p. single phase ball bearing, operating on 110 V., 60 Cycle AC current. Shipping weight, 80 lbs.

THE BUEHLER line of specimen preparation equipment includes . . . . CUT-OFF MACHINES • SPECIMEN MOUNT PRESSES • POWER GRINDERS • EMERY PAPER GRINDERS • HAND GRINDERS • BELT SURFACERS • POLISHERS • POLISHING CLOTHS AND ABRASIVES



Buehler Ltd.

A PARTNERSHIP

METALLURGICAL APPARATUS

165 West Wacker Drive, Chicago 1, Illinois

(*Continued from page* 184)

priority or a tax on the atmosphere—several other advantages are claimed for the practice of air drying. Skin drying through the application of artificial heat involves a certain amount of expense and the sand is dried only to a depth of ¼ to ¾-in. Drying a mold all the way through in an oven is the most expensive method and also introduces a hazard in a tendency toward causing the casting to crack. The air dried mold presents a firm shell or crust more than an inch in thickness against which the metal lies quietly and without erosion. The green sand backing yields readily to the contracting metal and thus eliminates the contraction hazard. Extended experience indicates that the relative proportion of sugar bearing binder material in the facing sand is reflected to a marked extent in the surface appearance of the casting.

This coincides with an interesting presentation of this subject in the December, 1944, issue of THE FOUNDRY, in which Harry W. Dietert stated that the combustible materials such as sea coal, pitch, coke, cereal, molasses, sugar, oils, resins, wood flour, urea, asphaltic materials and others placed in molding materials, produce a facing effect on the casting surface due to the hot gas pressure developed and due to semi-effective reducing type of atmosphere.

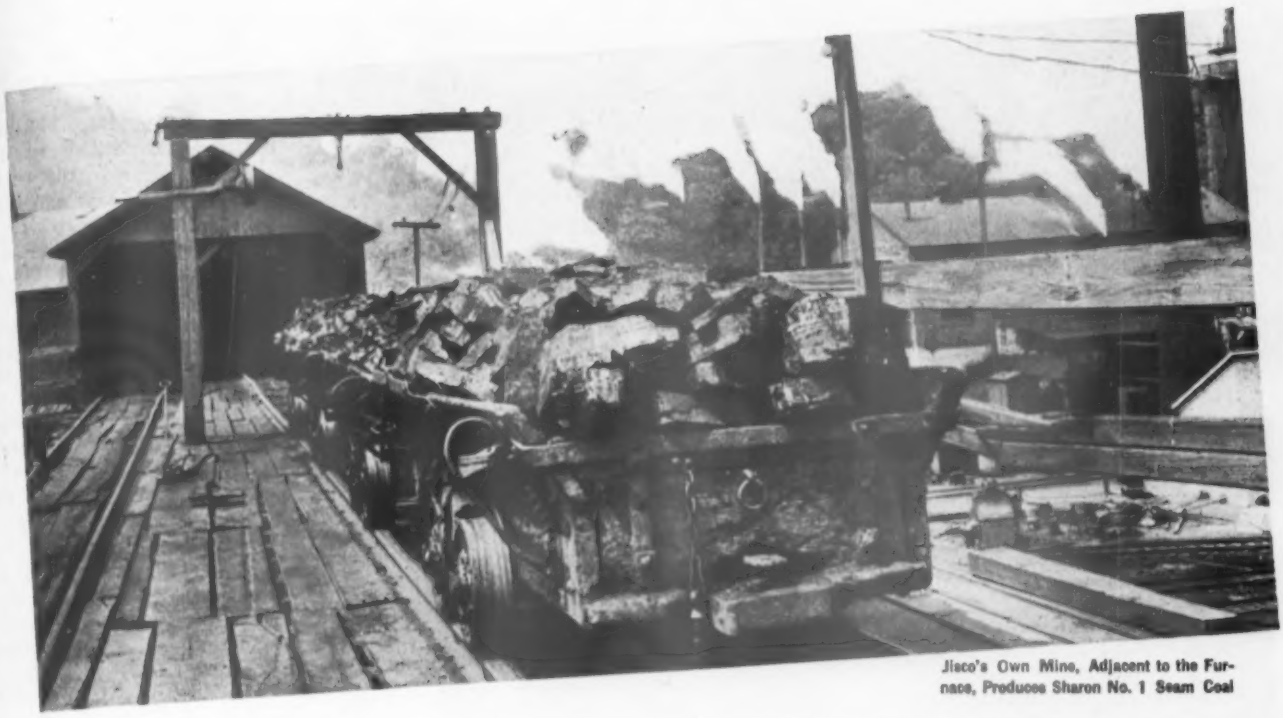
Exercise Close Control

While outward appearance is an important factor, the Navy Department rejects all castings that do not measure up to chemical and physical specifications. Through an adequately equipped and staffed laboratory, close control is exercised over the purchase of raw materials, the processing of these materials and the condition of the resulting castings. In addition to routine testing, a constant program of investigation toward improvement is going forward. A special lead lined chamber is devoted to inspection of castings under a million-volt x-ray machine.

Two accompanying illustrations show the result of recent experiments to determine the effect of pouring pressure tight valve castings under a high head. In the usual routine method these castings are provided with several large feeding heads which increase the cost of molding, of melting extra metal in excess of the weight of the casting, and of removing the heads from the casting in the cleaning room. With the characteristic and commendable caution of all true explorers, the experimenters are not prepared to claim that the method is a perfect solution for a constant and age-old foundry problem, but they are discreetly optimistic and—pending further investigation — respectfully beg to report considerable progress. Several castings successfully have withstood the rough machining, sectioning and x-ray tests.

Associated departments of the foundry not touched upon previously include the

(*Concluded on page* 188)



Jisco's Own Mine, Adjacent to the Furnace, Produces Sharon No. 1 Seam Coal

COAL IN A BLAST FURNACE!

another reason why JISCO SILVERY is a better blending iron

The production of Silvery Iron requires a higher temperature and a richer atmosphere than is ordinarily employed in blast furnace operation. Mother Nature obligingly assisted JISCO with her

SHARON NO. 1 SEAM COAL

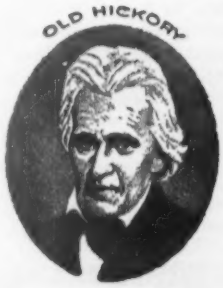
This coal is predominant in Jackson County, Ohio. It has special properties vital to the quality and production of JISCO Silvery Iron. A definite ratio of coal to furnace coke is used in the burden. The coal generates rich gases which pass up through the stack satisfying atmospheric requirements. Gases leaving the furnace are cleaned by electrostatic precipitation before entering the stoves where they create extremely high temperatures for the "hot blast".

This Sharon Seam Coal definitely is a contributing factor for even grain structure and uniformity of

JISCO SILVERY IRON

These qualities are reflected in the cupola. JISCO blends with gray iron scrap, steel and other melting stock for better finished castings. JISCO improves operations and reduces costs.

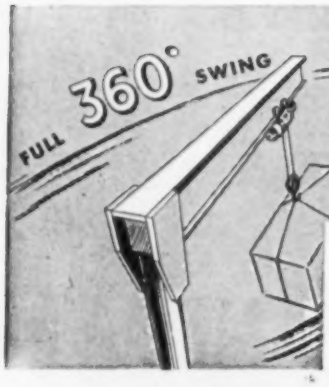
Our research department invites your questions and comments.



Andrew Jackson to his Troops, "If the enemy flee before us, we will overtake and chastise him: we will teach him how dreadful when once aroused, is the resentment of freemen."

HIGH SILICON IRON.
JISCO

THE JACKSON IRON & STEEL Company
JACKSON, OHIO.



CHICAGO TRAMRAIL

JIB CRANES

SPEED

POINT-OF-OPERATION JOBS

YOU SAVE... 1. MANPOWER 2. INSTALLATION COSTS 3. COMPENSATION COSTS 4 PRODUCTION COSTS 5. MAN-HOURS

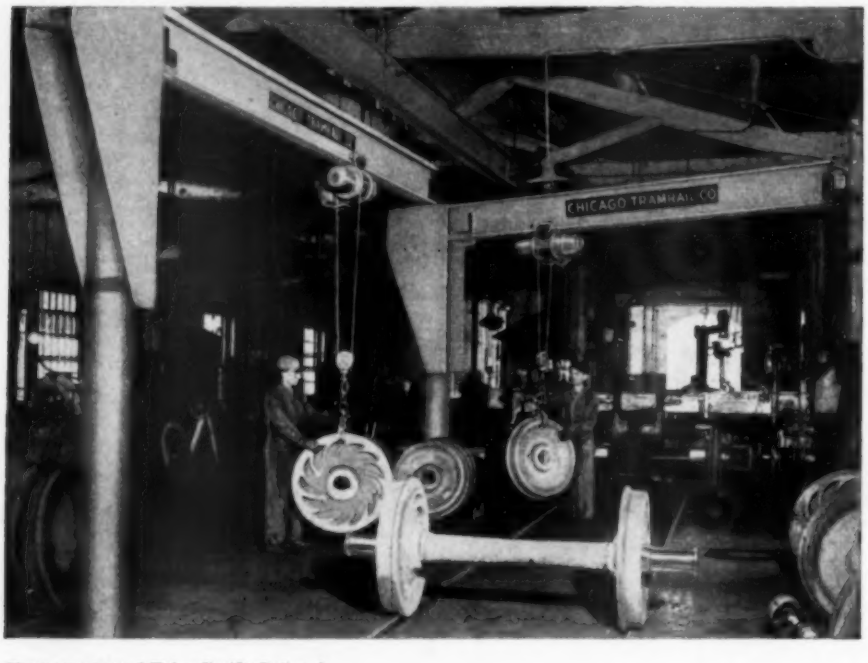
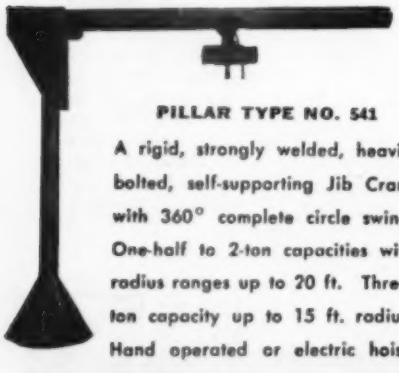


Photo courtesy of Union Pacific Railroad

The assembly of railroad wheel-and-axle units is a job that calls for precise coordination in heavy handling. Too light a job for costly overhead cranes, and too dangerous for all but the most skilled manual labor, it is an ideal application for fast-action, flexible Jib Cranes. Working in conjunction, the two nimble Jib Cranes ease the wheels into place on the axle swiftly and surely, without danger to the delicate bearing surfaces of the axle or journal. This used to be a job for skilled workmen, but now easy-to-operate Jib Cranes take over the difficult task—a real help in these labor-scarce times.

Jib Cranes help to reduce compensation costs because they lessen the probability of accidents that are so frequent in heavy handling. For example; the operation above was formerly a dangerous one. Many strains and broken bones resulted from rolling the heavy wheels into position, but now the men have only to guide the free-swinging Jib Cranes as they swing around, pick up the wheel and carry it to the point of assembly.



PILLAR TYPE NO. 541

A rigid, strongly welded, heavily bolted, self-supporting Jib Crane with 360° complete circle swing. One-half to 2-ton capacities with radius ranges up to 20 ft. Three-ton capacity up to 15 ft. radius. Hand operated or electric hoist.

IN *YOUR* PLANT

It's easy to see how swiftly, economically and safely Jib Cranes perform the operation illustrated. You can effect these same savings in your plant through the use of Jib Cranes. Look around your plant—you're sure to see many places where the use of these sturdy "mechanical muscles" will save you time and money as well as speed up production. Write for full particulars today. We will be glad to send you an illustrated circular showing the various types of Chicago Tramrail Jib Cranes together with many suggested applications for their use.

WRITE TODAY!

CHICAGO TRAMRAIL COMPANY

2910 CARROLL AVE. Phone KEDzie 7475 CHICAGO, ILL.

(*Concluded from page* 186)

pattern shop, the coreroom, the offices, and the personnel department. The pattern shop and pattern storage are maintained in a separate building. The core-making department is divided into two sections. Large cores are made on the floor in a space near the west end of the main bay and are dried in car type, oil fired ovens. Small cores are made in a room adjoining the south bay in the vicinity of the nonferrous section of the foundry. In addition to the usual machines, benches and ovens, this department is equipped with roller conveyor lines. Office of the master molder and adjoining offices occupied by the accounting and record keeping force, personnel, first aid and safety stations are located at the southeast corner of the main building.

Although not kept exactly as clean, shining and orderly as the main deck of a battleship, the good housekeeping program in the foundry reflects the navy atmosphere and discipline, with a place for everything and everything in its place. For example, two accompanying illustrations show the devices erected for the storage of lifting gear, chains, cables, turnbuckles and links. The arrangement not only fits in with a program of neatness and order, but is a time and effort saver. Any person who needs lifting gear goes directly to the racks instead of hunting all over the well known 40 acres of cluttered-up foundry floor.

Book Review

Proceedings of the Institute of British Foundrymen, Vol. XXXVII, 1943-1944, 290 pages, published by the Institute of British Foundrymen, Saint John Street Chambers, Deansgate, Manchester 3, England.

Containing 26 papers and discussions this volume constitutes the thirty-seventh annual report of the activities of the Institute of British Foundrymen. The papers are those presented not only at the annual general meeting held in London in 1944, but also at various branch meetings during the 1943-1944 season. The papers and discussions cover a wide range of topics in the foundry field relating to various branches, and include such phases as mechanical handling, inoculation of gray iron, centrifugal casting, heat treatment of steel, permanent molding of aluminum alloys, etc.

Of particular interest is a report of the institute's Melting Furnaces Subcommittee of the Technical Committee on the basic lined cupola. In addition to the various papers the book contains a report of the annual general meeting, presidential address, and the Edward Williams lecture by Sir Charles G. Darwin on "Tolerances and Inaccuracies in Physics."

Manhattan Rubber Mfg. Division, Passaic, N. J., has received renewal of its Army-Navy "E" Award for the third time. The first award was made on Oct. 28, 1943.

NO HEAT TREATMENT NEEDED

With

FRONTIER ALLOY "40-E"

THE OUTSTANDING HIGH STRENGTH ALUMINUM *Alloy*

The ALLOY that has ALL 6

Due to the unique metallurgical formula of Frontier "40-E"—an aluminum alloy containing zinc with magnesium, titanium and chromium as added ingredients—the desired strength and absence of brittleness is obtained without special and costly heat treatment. Extensive tests prove that "40-E" reaches stability at room temperature in a short period and does not increase or decrease in physical values after this stabilization has taken place.

ENGINEERING DATA ON REQUEST

The Frontier Alloy Data Book brings pertinent engineering and metallurgical facts on the physical properties of "40-E". In writing for your free copy, please state company name, your title, and address.

Licensing franchises now available in certain areas to meet the increasing demand for Frontier "40-E" Alloy. Details on request.

1. **Shock Resistance**—Tests have proved its exceptional ability to withstand explosive shock and standard impact shock.
2. **Corrosion Resistance**—Excellent, not only in standard corrosion tests but also under stress.
3. **High Yield Strength**—A dominant factor where distortion or misalignment of parts would make the assembly inoperable.
4. **Machineability**—Far superior to the usual sand cast aluminum alloys and machined parts have a high lustre.
5. **Pressure Tightness**—The fine grain of the alloy enables it to withstand high pressures.
6. **No Heat Treatment**—Physical properties are obtained by natural aging at room temperatures.

Specifications — Army-Navy Aeronautical Spec. AN-A-17; U. S. Navy Bureau of Ships Spec. 46A-1 (INT), Class 1; A. S. T. M. Spec. B26-42T, Alloy ZG-41, S. A. E. 310.

Typical Physical Properties — tensile strength, 35,000 psi.; yield strength, 25,000 psi.; elongation, 5% in 2".

FRONTIER BRONZE CORPORATION

4878 PACKARD ROAD

NIAGARA FALLS, NEW YORK

Build up PATTERNS with Celastic Colloid Treated Fabric

TRADE MARK REG. U.S. PAT. OFF.

(SUITABLE FOR PRODUCTION PATTERNS!)

SAVE TIME! LABOR! AND MATERIAL!

1. A felt-like cloth in thicknesses from .023-.105". (Shrinks slightly after applying.)
2. Softens by dipping momentarily in special solvent.
3. Shapes to any contour.
4. Bonds permanently to wood or metal.
5. Hardens and works exactly like wood.

Fitting a Compound Curve

Building Up a Metal Pattern

Hundreds of Pattern Shops and Foundries are finding this new lagging plastic the answer to many of their most difficult problems in building up patterns to any required thickness. It saves patterns that would otherwise be scrapped. It enables them to deliver jobs on time. It saves waste due to last minute changes in design. It is ideal for repairs also! Write for full details, easy directions for use, complete specifications and prices.

FOR COMPLETE DATA ON PATTERN SHOP SUPPLIES WRITE FOR CATALOGUE 40 SECT. 1

The WELLMAN PRODUCTS Company

East 49th Street at Superior Avenue • Cleveland 3, Ohio

PATTERN SHOP SUPPLIES
TOOLS FOR PATTERNMAKERS
POWER TOOLS AND EQUIPMENT
PATTERN LETTERS & FOUNDRY MARKS

ANOTHER LABOR-SAVER:
WELLMAN MAGNESIUM PATTERN PLATES!
⅓ Lighter . . . ⅓ Stronger than Aluminum.
Easy to drill and tap!
IN ALL SIZES!
Also Machined and Plain Cast Aluminum Plates.
Order by FLASK size!

MELTING FURNACES AND PRACTICE

(*Continued from page* 103)

Small rotary furnaces are in some cases fired by town gas and on larger units firing is by pulverized coal, usually anthracite. Electric furnaces of the indirect rocking arc type with capacities up to 2000 lb are becoming popular for small melts of special irons but the three-phase direct arc type is little used for the cold melting of gray cast iron.

The provision of continuous metal for special purposes, that is, highly alloyed or low carbon compositions, has been solved in many cases by duplexing. Cupola metal is transferred to a batch type furnace for adjustment of composition and superheating. Three-phase arc and resistor electric furnaces as well as rotary furnaces are used for this service. With the latter type, creosote pitch firing gives a rapid heat input and it is possible to raise the temperature of a bath from say 2500 F to 2700 F at a rate of 10° per minute.

Superheat in Rotary Furnaces

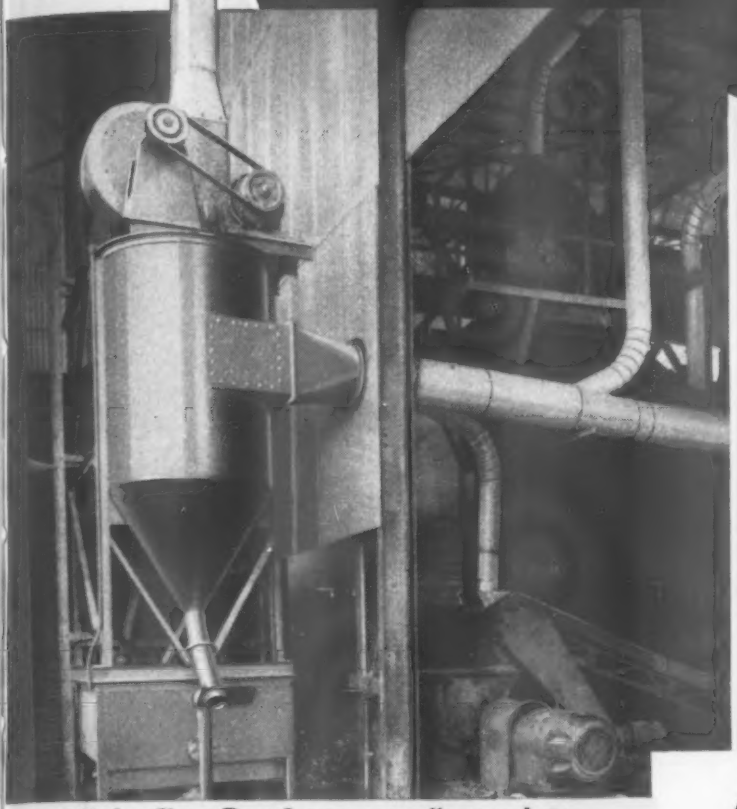
In a plant producing tank parts in blackheart malleable cast iron molten metal was needed with a high degree of superheat for a continuous casting plant. This was very successfully obtained by the use of a cupola with two rotary furnaces fired by pulverized anthracite. The rotary furnace charge consisted of cupola metal and an addition of approximately 25 per cent cold steel scrap. The charge was superheated in 60 minutes to a temperature of 2800 to 2850 F. During this period the analysis of the molten charge became known, thus enabling adjustments to composition to be made when required. On reaching temperature, the fuel supply was reduced and during the next hour the metal was taken for pouring on the plant. During this time the second rotary furnace was coming up to heat and became available immediately the first was ready for recharging. Losses of carbon, silicon and manganese from the beginning to the end of the holding period, while metal was being poured, was practicably negligible and did not exceed 0.15 per cent.

The greatly increased production of steel castings required during the past six years has necessitated the reorganization of existing foundries as well as the installation of new plants. Although electric melting has been installed for many special purposes, a large proportion of the new capacity consists of side-blown converters. The problem of supplying continuous steel for mechanized casting plants was new to the industry but has been met with complete success.

One method adopted in the production of special steels is the use of two direct arc furnaces, one for melting and

(*Continued on page* 193)

How to Eliminate Foundry Dust and Increase Efficiency



Hydro-Clone Dust Suppressor collects and suppresses dust from shake-outs, screens, elevators, etc.

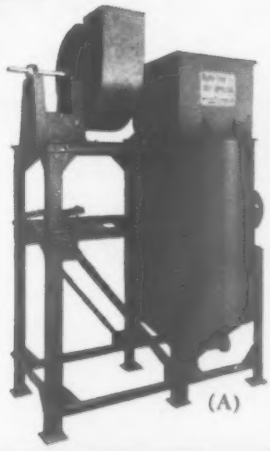
The clean, fume-free air resulting from use of the Whiting Hydro-Clone improves foundry working conditions ... contributes to the health and safety of workers ... pays dividends in increased efficiency.

Hydro-Clones are widely used in connection with sand-blasting equipment, tumbling mills, shake-outs, grinders, and other dust-raising operations. They completely suppress dust by wetting ... taking up to 99.6% of the dust out of foundry air.

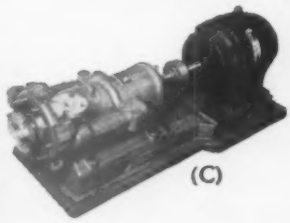
The Hydro-Clones shown here represent only a few of the many types available. All are individually engineered to specific needs.

WHITING CORPORATION
15607 Lathrop Avenue Harvey, Illinois

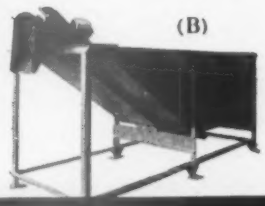
Hydro-Clone Grinding Bench is safe for finishing aluminum and magnesium castings.



(A)



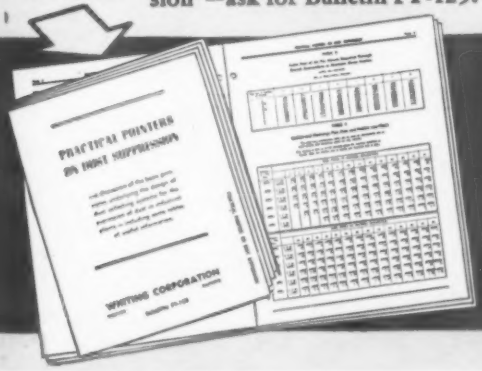
(C)



(B)

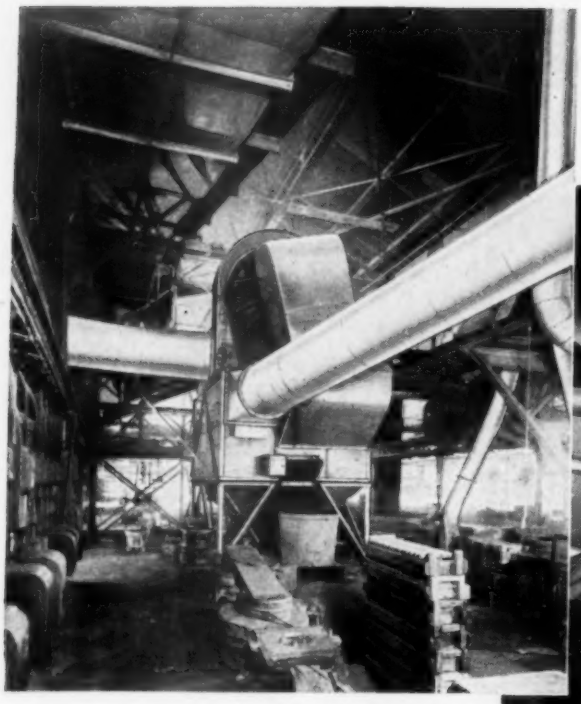
(A) Type "SH" Hydro-Clone.
(B) Sludge Tank with automatic sludge ejector.
(C) Hydro-Brasive Pump.

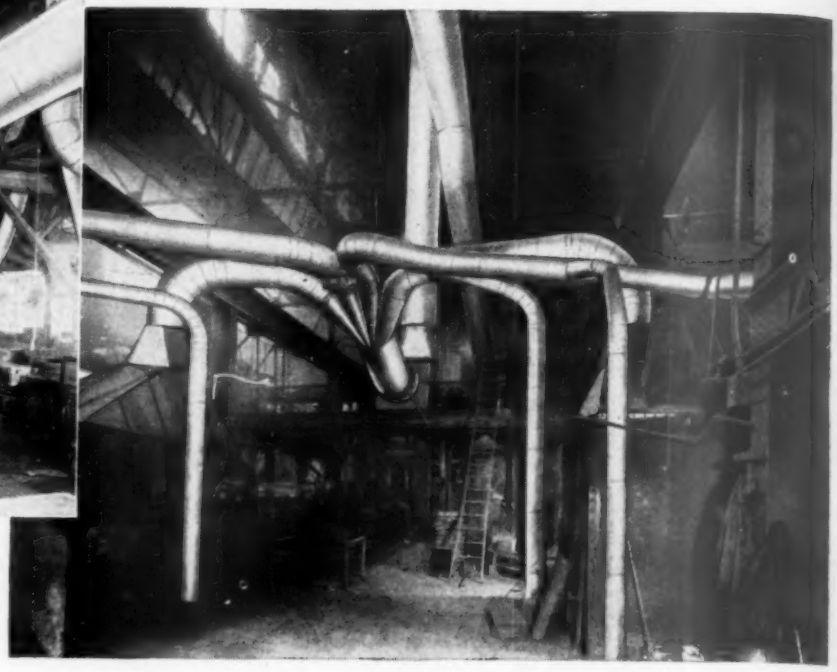
FREE BOOKLET "Practical Pointers on Dust Suppression"—ask for Bulletin FY-129.



WHITING
CORPORATION
HYDRO-CLONE DUST
SUPPRESSION EQUIPMENT

PRODUCTION CONTINUED





Two views of Dust Control System installed at G.H.R. Foundry Division of Dayton Malleable Iron Co. Air volume handled is approximately 103,000 CFM.

As Kirk & Blum Engineers Install Complete DUST CONTROL System

No interference with foundry production! This was among the major problems that had to be solved by Kirk & Blum "Air Engineers" in the installation of a complete, efficient, custom-built Dust Control System at G. H. R. Foundry Division of Dayton Malleable Iron Company, Dayton, Ohio.

The entire system was planned and designed to meet the requirements of this particular job—then erection was carefully scheduled and the entire installation made while *foundry production continued uninterrupted.*

G. H. R. is a small parts, high production foundry, and each unit of the dust control system had to be located so as to avoid interference with conveyors and other mechanical handling equipment.

***Modernize now*—with K & B Dust Control. Protect your workers' health, increase their efficiency, step up the quality and quantity of your production. Call on Kirk & Blum Engineers—backed by 38 years' experience in this specialized field. Write now for full information.**

SEND FOR BOOKLETS:

"Dust Collecting Systems in Metal Industries"
"Fan Systems for Various Industries"
"Blower Systems for Woodworking Plants"
"Industrial Ovens"
"Cooling Systems for the Glass Industry"
"Data on Kirk & Blum Production Facilities"

KIRK AND BLUM

The KIRK and BLUM MFG. CO. 2808 Spring Grove Ave. Cincinnati 25, Ohio

(*Continued from page* 190)

the other serving as a holding furnace. A feature of this arrangement is the very high electrical input per unit of capacity, of the order of 1500 kva per ton, used on the melting furnace. This enables a heat to be melted down ready for transfer to the holding furnace in 30 to 40 minutes. Special care, of course, is necessary in the operation of these furnaces to avoid damage to refractories. Both furnaces are of the lip axis tilting type, the molten charge being transferred down a launder into the holding furnace, which has a capacity approximately double that of the melting furnace. This setup yields steel of very uniform composition, slight variations in analysis being smoothed out by the relatively large bath of metal maintained. Electric furnaces are being employed also to provide continuous metal in cupola converter plants in the triplex process. Here the arc furnace is acid lined and used for maintaining and superheating the melt.

By giving special care and attention to the operation of both cupolas and converters, it has been found possible to supply converter metal direct to continuous casting plants. In one plant[8] austenitic manganese steel has been supplied for the continuous production of castings without the use of a holding furnace. By careful control of the temperature and composition of the cupola metal and in the operation of the converter this can be accomplished successfully.

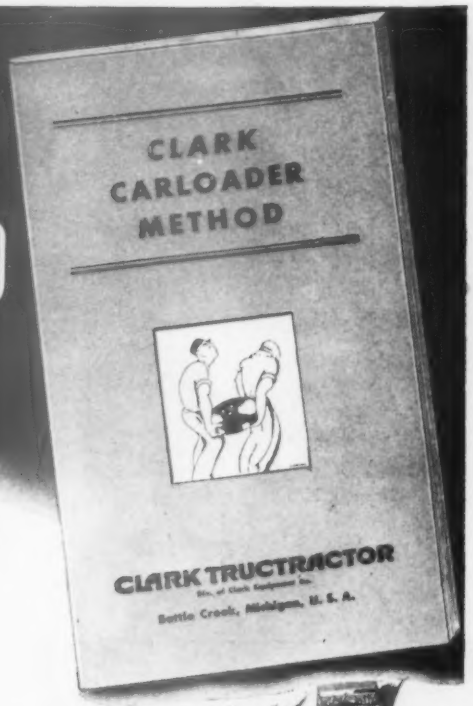
Carried On Experimental Work

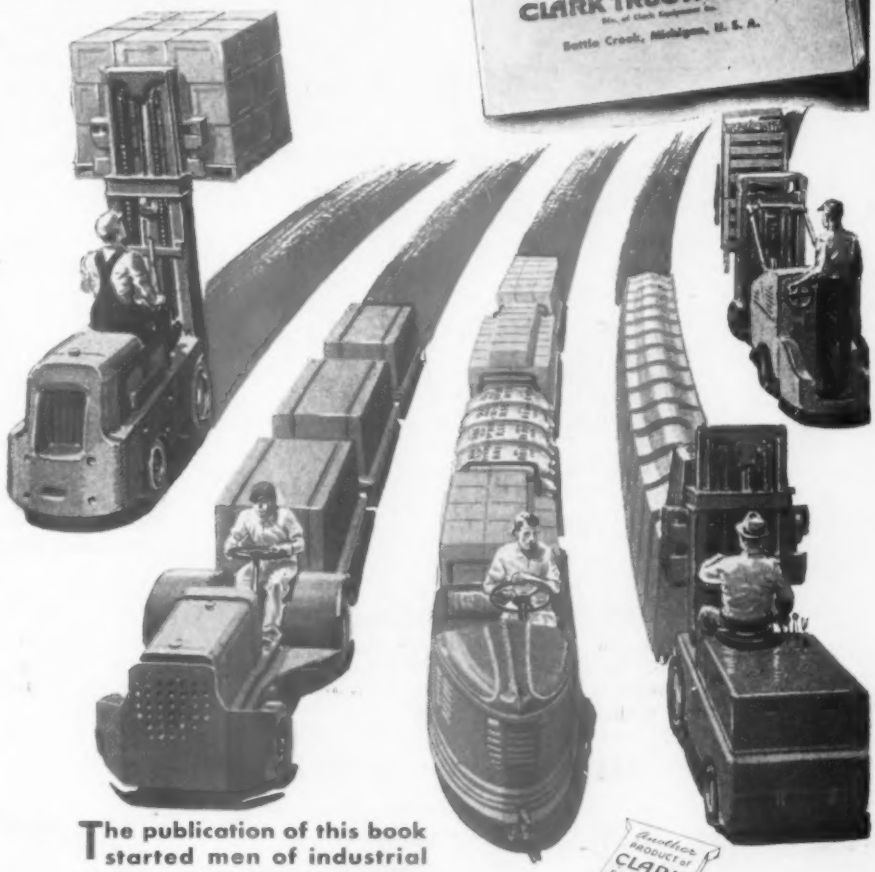
The main disadvantage of the converter process in this country in the recent emergency was the shortage of hematite pig iron, the production of which depends largely upon imported ores. For providing the necessary silicon content, ferrosilicon may, of course, be used in place of hematite but this also has been a critical material. The need for installing new converter plants under these conditions led to experimental work being undertaken to see how far the operation of the side-blown converter is dependent upon silicon to give the required temperature to the resulting steel. It was found that this element could be largely dispensed with provided the metal charged into the converter was sufficiently hot in the first place. A very full description of the layout and operation of a converter plant of this type has recently been given by Fassotte[9]. The cupolas are designed to melt charges consisting entirely of steel scrap. The molten metal, which may have a silicon content as low as 0.10 per cent, is desulphurized in the ladle and transferred for superheating to a rotary furnace fired by pulverized anthracite. Comparing the operation of this type of plant with normal side-blown converter practice, apart from advantages arising from the elimination of hematite pig iron and the fact that consumption of ferrosilicon is reduced to

(*Continued on page* 196)

This Book... REVOLUTIONIZED MATERIAL HANDLING

...it defined and crystallized the unit packaging method





The publication of this book started men of industrial plants and railroads thinking along new lines.

Another PRODUCT of CLARK EQUIPMENT COMPANY

Out of this book stemmed the material handling principles and methods that have enabled the Army and Navy to successfully handle in this war the burden of supplies, munitions and equipment.

Use the coupon below for your copy.

CLARK TRUCTRACTOR DIVISION
1016 JAMES STREET • BATTLE CREEK, MICHIGAN

I would like a copy of your book "CLARK CARLOADER METHOD"

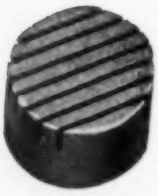
Name_____

Company_____

Address_____

City_____ Zone_____ State_____

for Top Efficiency in



TYPE "A"

TYPE "B"

TYPE "C"

AIR RELEASE VENTS

ALL TYPES AND SIZES

TYPE "A"—Smillie all brass, milled slots. Heads .093" thick. Slots .01" wide. Thick heads are specially designed for contour work, can be shaped either in or out of core box. Best general all around vent. Number of slots increase with diameter.

TYPE "A-1"—All brass, milled slots, thin heads. Slots either .013" or .015" wide. Used for coarse sands. Number of slots increase with diameter.

TYPE "B"—All brass, perforated staggered slots .016" x .120". Thin heads, same size slots in all diameters. Specially useful in steel foundries, very easy to keep clean. 1/2" diameter and over have brace wires under head for added reinforcement.

TYPE "C"—All steel, thin heads. Three milled slot widths .010", .013" and .015". The .010" width is considered standard. This type of vent is used on flat spots where resistance to wear is required.

TYPE "D"—Brass body, stainless steel wire mesh. Made in 30, 40, and 50 mesh. The 40 mesh is considered standard. Used many years for satisfactory venting.

TYPE "E"—All brass, thin heads. Round perforations of .020", .023", .027" and .032" diameters. The .023" is considered standard. Easy to keep clean.

TYPE "M"—Brass body, steel wire mesh in sizes 30, 40, 50 and 60. The 40 mesh is considered standard. This type features a heavy body.

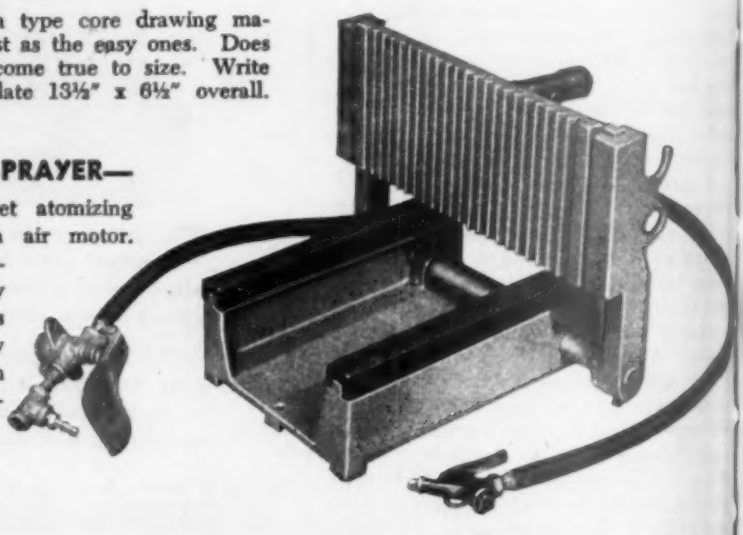
TYPE "S"—Brass body, monel wire screen in sizes 30, 35 and 40. Vents 1/8" diameter come in 50 mesh only—3/16" diameter in either 35 or 40 mesh. Mesh 35 is considered standard. Vents 1/4" diameter and over have brace wire under screen for reinforcement.

PRICES EACH

Dia. Inches	Type "A"	Type "A-1"	Type "B"	Type "C"	Type "D"	Type "E"	Type "M"	Type "S"
1/4"	.07	.07	...	.056	....	....	....	.05
3/16"	.07	.07	...	.056	.049	.049	.049	.08
1/4"	.075	.075	.08	.064	.056	.056	.056	.08
5/16"	.075	.075	.08	.072	.063	.063	.063	.08
3/8"	.08	.08	.08	.08	.07	.07	.07	.08
7/16"	.08	.08	.10	.088	....	....	.07	.10
1/2"	.085	.085	.10	.096	.084	.084	.084	.10
9/16"	.085	....	.12	....	....	....	.084	.12
5/8"	.09	.098	.12	.098	.098	....	.098	.12
11/16"	.09	...	...	....	....	....	.098	...
3/4"	.095	.112	.15	.128	.112	....	.112	.15
13/16"	.095	....	...	....	....	....	....	...
7/8"	.10	.126	.15	.144	....	....	....	.15
1"	.12	.14	.20	.16	.14	....	....	.20
1 1/4"	.14	.182	...	.208	....	....	....	...
1 1/2"	.203	.203	...	.232	.203	....	....	...

Where prices not shown, unable to furnish.

ROSS CORE DRAWER—This bench type core drawing machine draws the difficult boxes just as fast as the easy ones. Does not require skilled labor. Makes cores come true to size. Write for details. Weight 42 lbs. Vibrator plate 13½" x 6½" overall. 16½" wide, 14" long, 12" high.



GAST CORE AND MOLD SPRAYER—

Low pressure, large jet atomizing sprayer, equipped with air motor. Gear driven paddle agitator for applying any type of wash. Wash is kept in suspension by paddle agitator when in use. Write for the complete story on this.

THE FREEMANS

PATTERN SHOP & FOUNDRY SUPPLIES & EQUIPM

1152 EAST BROADWAY

...in the Core Room...

CARTRIDGE CORE BLOWER

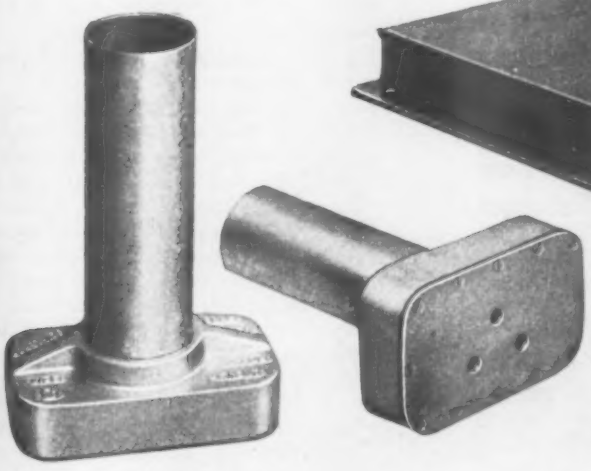
(BENCH TYPE)

You can make those small intricate cores with remarkable speed and efficiency on this cartridge core blower. Eliminates sand troubles. A ¾" airline with 80 to 120 lbs. pressure is sufficient to make cores in single or gang boxes requiring a maximum of 2 lbs. of sand. The actual operation of plunging the cartridge in a pile of sand on the core bench and blowing the core is a matter of seconds. You'll raise the quality and quantity of your cores.

PRICE

$295.00

Includes Type "C" Cartridge



Write for Descriptive Folder

STANDARD SAND CARTRIDGES

SIZES	DIMENSIONS (Inside Base)	PRICE
A	3⅛" x 3⅛"	$10.00 each
B	2¼" x 5¼"	11.00 each
C	3" x 5¼"	11.00 each
D	2¼" x 7¼"	12.00 each
E	2⅝" x 8⅛"	12.00 each
F	3" x 7¼"	14.00 each
G	4⅛" x 5¼"	14.00 each
H	4⅛" x 6⅛"	15.00 each

(To determine outside dimensions, add ⅛" to width and length of inside dimensions, as shown above.)

Special size sand cartridges can be furnished upon application.

*This size adaptable to a large range of core boxes.

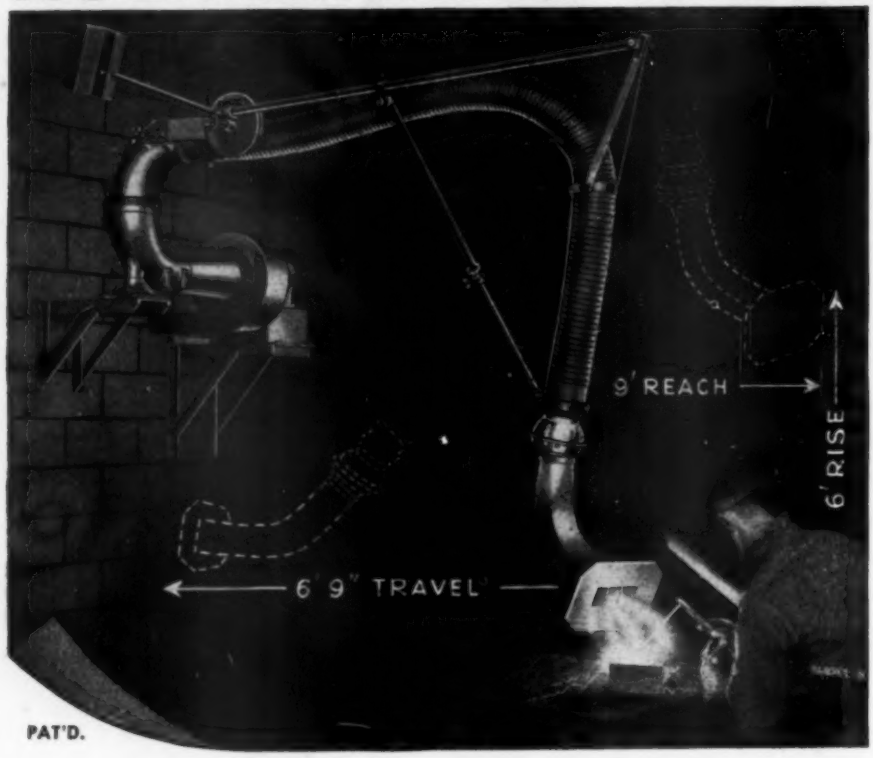
NSUPPLY COMPANY

IES EQUIPMENT—MAHOGANY AND PINE PATTERN LUMBER

Tel. TAylor 4624

TOLEDO 5, OHIO

RUEMELIN Fume Collector



PAT'D.

REMOVES WELDING FUMES

At the Source!

No longer need your employees inhale welding fumes. A Ruemelin Fume Collector solves the problem, quickly and efficiently. It produces a powerful suction that draws out noxious gases, smoke and heat *at the source*. Guards employee health, resulting in less welder fatigue, therefore greater plant output. Has many exclusive features: (1) Clears shop air with minimum loss of building heat. (2) Exhaust snout can be positioned instantly and conveniently. (3) Covers maximum welding territory, vertically, horizontally and by circle swing. (4) Shipped completely assembled, easy to install. Thousands of Ruemelin Fume Collectors now serving war industries. 9 ft. and 15 ft. sizes (radius of swing).

We gladly offer engineering service for your fume collector installation. Write for Bulletin 37-C.

RUEMELIN MFG. CO.

3850 NORTH PALMER STREET • MILWAUKEE 12, WISCONSIN, U. S. A.

MANUFACTURERS AND ENGINEERS

SAND BLAST AND DUST COLLECTING EQUIPMENT, WELDING FUME COLLECTORS

A 4709-$\frac{2}{5}$-R

(*Continued from page* 193)

negligible proportions, it is found that blowing losses are reduced to an average of 5 to 6 per cent and the duration of the blow to an average of 11 minutes. The life of converter linings is also considerably increased.

In spite of the developments which have taken place in gray cast iron and the need for producing castings to ever closer limits of composition, the advances which have been made simultaneously in cupola control, and the increased knowledge of the melting process obtained over the last few years, give assurance that the cupola will continue as the prime melting unit in the iron foundry. With greater attention to design, particularly with a view to securing uniform blast distribution, and for special applications, by the use of heated and/or humidity controlled air, this furnace is capable of meeting most requirements in the production of high duty irons. Where special compositions are needed which are unobtainable by straight melting, the duplexing of cupola melted metal offers a rapid and economical method of obtaining the required analyses.

There are indications that the use of water cooled linings will increase in furnaces operated on long melts, as by this means considerable savings in labor and materials can be effected. Further savings in labor will also be obtained by the more widespread use of mechanical aids in the stockyard and for the raising of materials for charging.

Need Heated Receiver

Further developments in the design and application of holding furnaces must take place and there is at present a real need for some simple form of heated receiver, in which a bath of cupola metal may be mildly superheated without losses of metalloids.

Developments in high duty irons have drawn attention to the properties of cupola coke, and in spite of the excellent quality of present day coke supplies, much investigational work is required to explain and assess the properties of the various types available. It is known, for example, that certain cokes yield a high pickup of carbon, some take a relatively long time to reach their maximum temperature, and some cokes stand up better than others to the use of high blast pressures. The tests at present available are not of great value in indicating the conditions under which a coke will give its best service, and a most useful advance will be made when it is possible to specify certain measurable coke properties to meet particular operations conditions.

In many of the steel foundries operating converters, cupola design and operation has not in the past received the attention it deserves and use has not been made of the advances in melting technique developed in the ironfounding industry. The recent emergency has shown the benefits which may be derived from correct cupola practice in the

(*Concluded on page* 199)

HOWARD craftsmen and facilities are available to produce quality wood and metal patterns.

HOWARD craftsmen thoroughly understand foundry practices.

HOWARD patterns are engineered to fit your foundry requirements.

HOWARD modern facilities include two three-spindle type Keller Duplicators which are available for all types of metal duplicating work.

HOWARD FOUNDRY CO.

Pattern Division

General Office 4900 Bloomingdale Ave.

CHICAGO 39, ILLINOIS

VOLCLAY BENTONITE

NEWS LETTER No. 10

REPORTING NEWS AND DEVELOPMENTS IN THE FOUNDRY USE OF BENTONITE

LOOKING FORWARD

The advent of peace has given all of us – the foundrymen, supply dealers, and bentonite producers – a chance to relax and turn our minds and efforts into different channels.

In a peace-time world, quality again will be a major buying factor. Uniform excellence of castings is the direct result of a combination of superior workmanship and the finest of raw materials. There is no substitute for either ingredient.

Since 1927, the trademark VOLCLAY on a bag of bentonite has been the assurance of the highest quality product available. The high standards for VOLCLAY have never been lowered, not even to meet the most pressing demands for greater output. We are not resting on our good record, but planning even greater product improvement.

VOLCLAY

As our technicians return, we make increasing progress on our peace-time planning. New equipment for our laboratories is being secured, our plants are being redesigned and modernized, and new plants are planned for the future – all based on the idea of maintaining and improving VOLCLAY bentonite.

AMERICAN COLLOID COMPANY
363 WEST SUPERIOR STREET • CHICAGO 10, ILLINOIS
Producers of Volclay and Panther Creek Bentonite

(*Concluded from page* 196)

operation of converter plants. In this country, electric power is still largely derived from coal which is, of course, burned without conservation of by-products. Under present conditions of coal shortage which, together with high costs may continue for some considerable time, there are obvious advantages, quite apart from questions of national economy, in using coke where possible as a fuel in the steel foundry. For these two reasons it is expected that the use of the converter will tend to increase.

In the continuous production of steel castings from highly mechanized plants, the triplex process employing both the converter and electric furnace certainly offers many advantages, for the higher grades of steel, the use of the basic electric furnace in conjunction with the converter appears well worth consideration. Present work on the basic lined cupola, however, suggests the future possibility of converter steel with sulphur and phosphorus contents approaching those available from the basic electric furnace.

References

1. British Patent No. 562,919.
2. Pivowarsky, Giesserci, 1943, Vol. 30, No. 20/22.
3. Renshaw. *Foundry Trade Journal*, Vol. 70, No. 1401, June 24, 1943.
4. *Proceedings*, Institute British Foundrymen. Vol. 37, 1943-44. See also *American Foundrymen*, Vol. 7. Nos 2 and 3, Feb. & March, 1945.
5. Bolton & Hill, *Proceedings*, Institute British Foundrymen, Vol. 36, 1942-43.
6. Developments in the design and use of side-blown converter plants. Iron & Steel Institute preprint, June, 1944.

Occupies Enlarged Quarters

Franklin Glue Co., Columbus, O., has occupied enlarged quarters which provide much needed expansion of the company's manufacturing, research and sales facilities. The two-story brick structure is complete with three overhead cranes, receiving entrance, shipping platform and office space. New and modern equipment has been installed to increase production of the company's small package units. The company's products are used extensively in the woodworking industry, including patternmaking.

Book Review

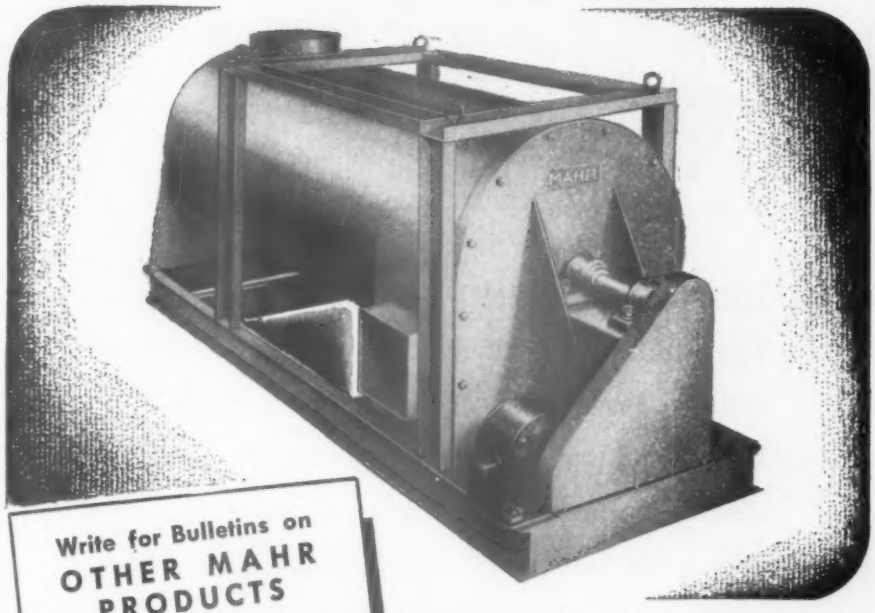
Proceedings of the American Society for Testing Materials, 1944, 1131 pages, published by the American Society for Testing Materials, Philadelphia 2.

Containing all the committee reports, technical papers and discussions presented at the forty-seventh annual meeting of the American Society for Testing Materials, this volume comprises No. 44 of its proceedings. It presents the summary of the annual meeting, annual address of the president, annual report of the executive committee followed by the various committee reports, the Edgar Marburg lecture, and the technical papers and discussions.

BIG MOLDS dried from the INSIDE OUT

This entire unit is mounted on a heavy channel steel frame, and can be quickly crane-lifted and set atop any large mold, or on the floor by it. With this MAHR Portable Mold Dryer you dry "from the inside out". The drying is accomplished where the metal is actually poured and the casting formed, making it necessary to dry only to a depth of two or three inches. Results: Easier shake-out, re-use of the outer sand without treatment, drying time cut 35% to 50%, and *better* molds and castings. MAHR Portable Mold Dryer may be either gas or oil fired, and is made in four sizes from 250,000 to 1,250,000 BTU Cap. May be used as an air heater if desired. Ask for Bulletin No. 1050.

MAHR Portable Mold Dryer



Write for Bulletins on OTHER MAHR PRODUCTS

Annealing furnaces
Stress relief furnaces
Torches for skin drying and cupola lighting
Crucible melting furnaces for non-ferrous metals
Ladle heaters and dryers
Burners . . . Blowers

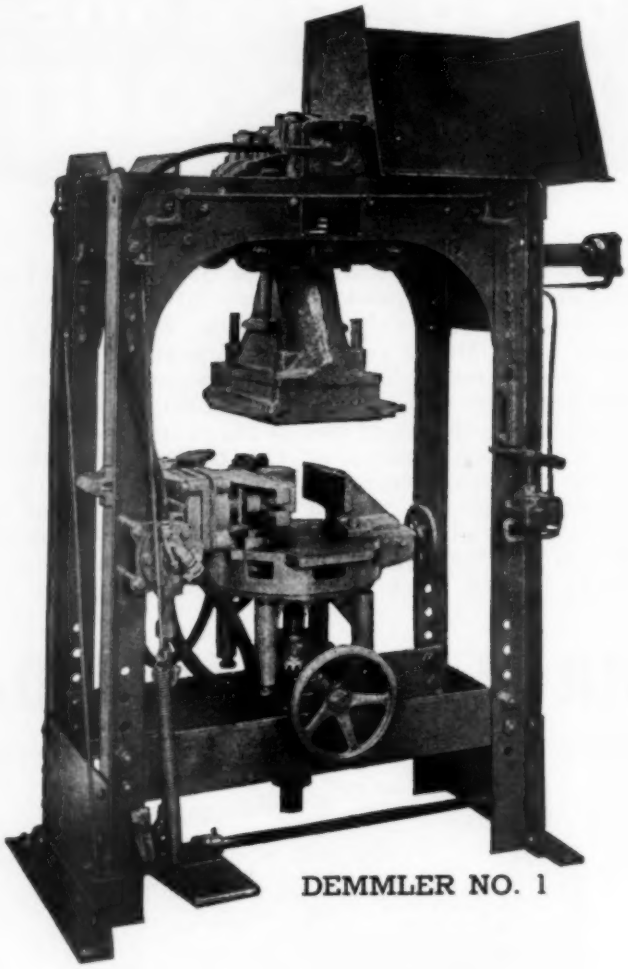
There are MAHR engineer-representatives in principal cities who will be glad to consult with you on foundry problems, and give you complete information on any MAHR products.

MAHR
ENGINEERS • DESIGNERS • MANUFACTURERS
ALL EQUIPMENT FOR METAL HEATING

MAHR MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.
1709 North 2nd St., Minneapolis 11, Minn.

★ ★ ★ SINCE 1911 ★ ★ ★

DEPENDABLE **CORE BLOWING** EQUIPMENT



DEMMLER NO. 1

This unit designed especially for small core work such as plumbing goods, electrical fittings, stove burners, valves and small pipe fittings. Ideally suited to quantity core production on all types of small brass, malleable, and gray iron work. Detailed specifications on this or other models on request . . . a type and size for every core blowing need.

WM. DEMMLER & BROS.
KEWANEE, ILLINOIS

CORE BLOWERS *Exclusively*

TROUBLE SHOOTING IN MAGNESIUM

(*Continued from page* 98)

oxide off before the rods were used. As a result compounds of magnesium oxide were being thrown into the weld in a liquid state. The foundry was advised to remove the scale with emery paper and this corrected the difficulty.

Magnesium, particularly in the liquid state, is a "must" metal. The practices which are being developed will be reflected in the entire foundry industry of the future, because you "must" do with magnesium in molding, coremaking and melting practice what should always have been done with any other type of metal.

One of the most important things in magnesium foundry practice is the development of supervision of the proper type and the proper quantity. Providing a foundry superintendent, a foundry foreman and a metallurgist is not enough. Every department must have sufficient and proper supervision. This is especially true in molding where it is difficult if not impossible to secure the right type of labor. As fast as men can be trained, it will pay dividends to put them into supervisory capacities instead of keeping them on the production end.

Suggest Refresher Course

A refresher course in physics will do more good in the casting of magnesium than a thorough study of chemistry. Physical factors and conditions are present in magnesium practice that never were present in the casting of any other metal.

Foundry consultants have a few trade secrets. Usually these are not divulged to the public, but on one particular case one or two of them will be exposed to view. The first is my belief that regardless of how many foundries a man has worked in, regardless of his general broad experience and his ability to pass on that experience, he cannot have a complete knowledge of the working conditions that prevail in any foundry where he is called in to help. The only way that a foundry consultant can succeed in solving difficulties in any shop is to find the forgotten man in the shop. Without exception, in every foundry where I have worked as a consultant, the forgotten man has always been found. He is a mechanic, usually reticent, bashful, and retiring. He is undemonstrative and unappreciated, but he is a student and in his quiet dignified way he has the answer to many shop difficulties. It is the consultant's job to find that man and after finding him to tell the boss that there is such a man to take care of the job.

Magnesium foundrymen frequently have overlooked the skeletonizing of molding equipment and core equip-

(*Concluded on page* 202)

WHY CLECO CHIPPERS *are better...*

1 **THROTTLE VALVE** graduated for easy starting.

2 **RENEWABLE BUSHING** saves handle if handle bushing should break.

3 **DROP FORGED ALLOY STEEL HANDLE** provides comfortable grip.

4 **SIMPLE WAFER VALVE** is durable, powerful and economical.

5 **EXHAUST CLIP** can be turned to direct exhaust away from the operator.

6 **CYLINDER,** or barrel, is made of carefully selected alloy steel, and is expertly heat treated, ground to accurate size, and finally honed.

7 **THROTTLE PLUNGER** operated in a renewable bushing.

8 **RENEWABLE TOOL NOSE** for standard round or hexagon shank chisels.

9 **LOCKING RING** with teeth that mesh with teeth on handle and keys that engage keyways on barrel.

Cleco heavy duty model, style "W" with "BG" handle

Cleco Chipping Hammers are available in 47 sizes and styles—this large line contains the exact tool for every chipping, beading, calking and scaling need.

THE CLEVELAND PNEUMATIC TOOL CO.

BRANCH OFFICES IN ALL PRINCIPAL CITIES

3781 EAST 77th ST. • CLEVELAND 5, OHIO

Ask for large, illustrated Catalog!

SOME "FALLS BRAND" ALUMINUM ALLOYS

Aluminum Calcium
Aluminum Chrome 85/15
Aluminum Chrome 90/10
Aluminum Copper 50/50
Aluminum Copper 60/40
Aluminum Copper 80/20
Aluminum Copper Nickel 50/25/25
Aluminum Copper Silicon 50/25/25
Aluminum Iron 50/50
Aluminum Iron 80/20
Aluminum Magnesium 90/10
Aluminum Magnesium 98/2
Aluminum Manganese 75/25
Aluminum Manganese 80/20
Aluminum Manganese 90/10
Aluminum Manganese 95/5
Aluminum Manganese, Metallurgical Grade
Aluminum Nickel 80/20
Aluminum Nickel Copper 50/25/25
Aluminum Shot
Aluminum Silicon 50/50
Aluminum Silicon 75/25
Aluminum Silicon 88/12
Aluminum Silicon Copper 50/25/25
Aluminum Solder
Aluminum Titanium
Aluminum Vanadium
Aluminum Zirconium

This partial list is but a few of the many alloys we make. Each is for the specific purpose of adding quantities of high melting point metals to standard alloys.

There's a

"Falls Brand" Alloy

For Every Use.

Our Telephone Number It's Buffalo Riverside 7812-3-4

NIAGARA FALLS SMELTING & REFINING CORPORATION
America's Largest Producers of Alloys
BUFFALO 17, NEW YORK

(*Concluded from page* 200)

ment. A core for a magnesium casting should have at least 300 per cent more mechanical venting than a core used for heavier metals. Any velocity built up at a provided vent causes a back pressure. All the gases cannot come through the provided vent and will impinge on the metal in the mold.

An illustration of the point is found in connection with a bell foundry. A sound bell that will ring true to tone cannot be made with conventional molding. The bell foundries make an arbor that is 1¼ or 1½-in. smaller than the periphery of the core. Because of its physical dimensions, the form is swept on the bell. The sand is thrown on the arbor and after sufficient bulk is obtained, as in the case of soil pipe, it is swept off with a templet prepared to proper contour. That gives 1¼-in. of sand inside and outside the bell mold cavity. This method of molding provides a perfectly uniform rate of cooling and proper directional cooling which permits the bell to be cast sound and to ring true to tone. Similar ideas can be developed for producing sound magnesium castings. By skeletonizing the amount of sand around the pattern, it is possible to obtain a uniform rate of cooling.

Chilling and Risering Overdone

Chilling and risering of magnesium castings probably have been over-emphasized. Where some shops are using 150 or 160 chills for a casting, others are making the same castings with only 10 or 15 chills. Where some may have as high as 52 per cent of the metal cast in risers, others slim down and have 32 per cent in the risers. By designing the riser to feed and dimensioning the risers at the juncture of the casting, it is possible to reduce the amount of metal in the riser, since the same static pressure is obtained whether the riser is ½-in. thick or 3 in. thick. If a riser does not feed it is because the juncture is not proper. Where a casting can be fed, do not chill it.

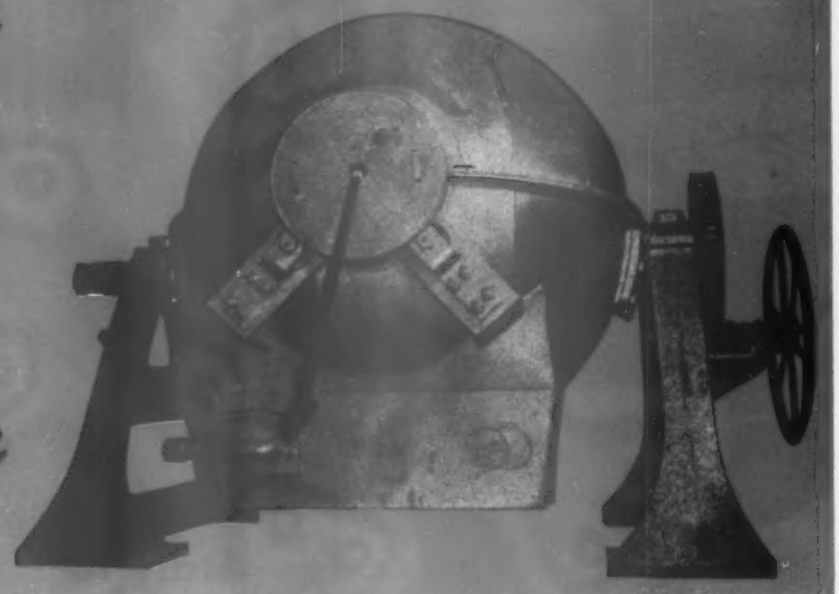
Skin drying of molds also should be mentioned. If the mold is skin dried sufficiently, steam can be seen coming off the face of the mold. If the steam has traveled in that direction, it also travels into the mold. The steam that has gone into the sand finally meets a cold spot where it condenses, thus producing a mass of water with no permeability. The gases resulting from pouring will neither go around that moisture nor pass through it, and hence are pushed back to impinge on the metal. I have seen a lot more difficulty and more scrap caused by skin drying than I have where the proper moisture has been maintained in the sand.

Worthington Pump & Machinery Corp. has placed in operation at its Buffalo works what is said to be the world's largest foundry shakeout system. The unit will handle flasks weighing up to 75 tons, including sand and metal, on a grate having an area of 372 sq ft.

NOW--MELT 3000 LBS. AT ONCE WITH A

ROMPH ROTATING FURNACE

A Revolutionary NEW-TYPE MELTING FURNACE FOR *Aluminum*



Note these IMPORTANT improvements in Aluminum Melting Practice

This new development is the design of Mr. Paul Romph, a practical foundryman, and is now offered as a direct aid in meeting post-war competition.

EXTREMELY FINE-GRAINED METAL

Since the metal charge *at no time* comes in contact with a direct flame, a melt of extremely fine grain and superior quality is produced. Hydrogen absorption is practically eliminated. There are no "local" hot spots and iron pick-up is consequently less. Fluxing by gas or solid material is possible.

LOWER FUEL COSTS—FASTER MELTING

Note this typical aluminum heat: heel—300 lbs; ingot charge—2750 lbs; burner time—*136 minutes* (to 1400° F). Fuel consumption (gas)—2,924 cu. ft, or slightly over one *cu. ft. of gas per pound of metal.*

EASIER TO OPERATE AND MAINTAIN

In case of pot failure, the charge is not lost. Merely rotate pot to another position and continue melting. In one large production foundry, a run of 3 weeks additional was possible after the pot had been repaired.

FURTHER SPECIFICATIONS AVAILABLE IN FOLDER "F-1"

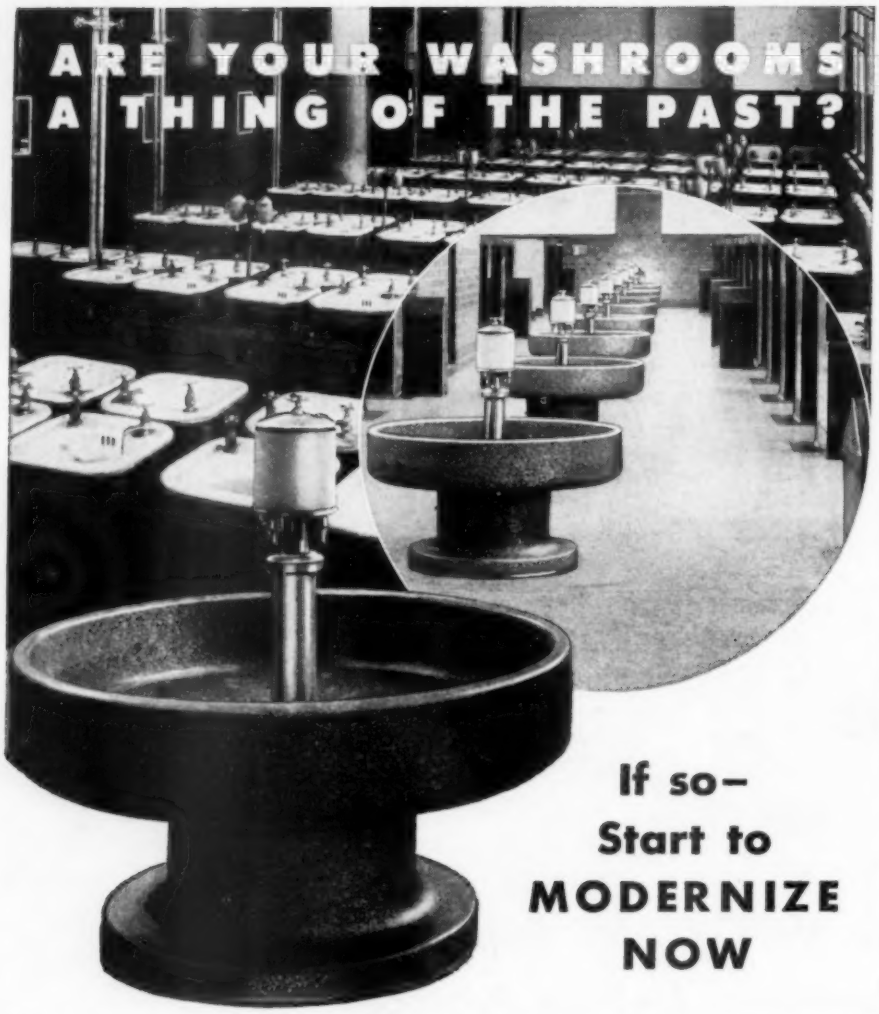
Melting pot may be changed in few minutes. No long cooling period required before changing.

Easy to charge. Even under maximum operation, the outer shell does not become hot.

Charges may vary from 1000 to 3000 lbs. Large castings can be poured from one furnace melt.

ROMPH FURNACE COMPANY

7849 HARTWELL DEARBORN, MICH.



If so—
Start to
MODERNIZE
NOW

In the days ahead when increased competition makes the need for *capable, efficient* workers even more urgent than at present, those plants with modern conveniences will benefit by attracting the better workers.

Clean, sanitary wash facilities stand high on the list of desirable features for they safeguard health, maintain goodwill, and help keep employees cooperative and satisfied with work conditions.

A Few Recent Bradley Washfountain Installations Include: 25 more for Brown & Sharpe, 6 more plus 3 Bradley Multi-Stall Showers for Youngstown Sheet and Tube, 21 to Milton Bradley Co., 11 to Singer Mfg. Co., 11 more to Remington Arms, 18 more to Chrysler (Calif. plant), 13 to Pennsylvania R. R., 8 to Shefford Hosiery Mills.

Bradley Washfountains provide the ideal, modern, sanitary facilities—serving up to 10 persons simultaneously with clean *running* water from a central sprayhead. One Washfountain takes the place of 8 to 10 separate "single-person" wash basins, each eliminating from 16 to 20 faucets. This alone, with the 80% reduction in number of piping connections, means a drastic cut in maintenance work.

Water is drained off as used—no dirty bowls to clean out—no delays—no contamination. Water consumption is much less with Bradleys, space is saved—cleanliness and health promoted. . . . . BRADLEY WASHFOUNTAIN CO., 2217 W. Michigan St., Milwaukee 1, Wis.

BRADLEY *washfountains*

Write today for Catalog 4308 and Washroom Survey Sheet.

MODERNIZING FOREMAN TRAINING

(*Concluded from page* 99)

instead of filtering down where they will do much good—among the foremen.

d. Government literature. Both federal and state labor departments publish a steady flow of new material that would be read with interest by foremen—if they could get hold of copies.

e. Moving pictures and slides. The number of films on supervision is fast increasing. Some are indifferent, but others are good. They can be rented for little money, and may do a big job in maintaining attendance and stimulating interest.

4. *New techniques.* Generally speaking, not enough thought has been given to the *method* of training. Consequently, too much reliance has been placed on the teacher-and-classroom variety—too little on capitalizing the resources of the foremen themselves. The discussion-type conference is not the sole answer; use should also be made of such devices as the quiz program, the clinic, the panel discussion, the forum, the symposium and other tried-and-tested conference techniques. Varying the *type* of meeting helps greatly to sustain interest, and also means more individual participants.

Committees and subcommittees also have a place in foreman training. Vastly more information can be imparted if consideration and screening are delegated to subgroups. Being appointed to a committee charged with the preparation of a written report, gives the supervisor the feeling of importance to which he is entitled. It is better, however, to type or mimeograph such reports and pass them around as *the basis of discussion* than to have them read aloud at foreman conferences.

5. *Changing the place of meeting.* "Do as much foreman training as possible outside the plant," is verified advice from one company which reduced the number of foreman conferences, but held them in a downtown hotel, in a private dining room. The sociability engendered by a pleasant meal carried over through each conference, and also heightened the group-consciousness of the supervisory employees who took part.

Visits to other departments also can be employed to create a change of scene. If held after working hours, they cause no disruption or distraction. Such visits are more interesting, of course, if certain key employees stay on for a short while to demonstrate the actual work performed.

This analysis is sketchy, but sufficient to show that *change* is easy to incorporate in the foreman training program. Once a fluid, dynamic method has been tried, neither the management nor the foreman will desire to return to the stereotyped pattern which has governed in the past. The foreman training program is a good tool. It is worth using well.

TO THE FOUNDING INDUSTRY

FOR

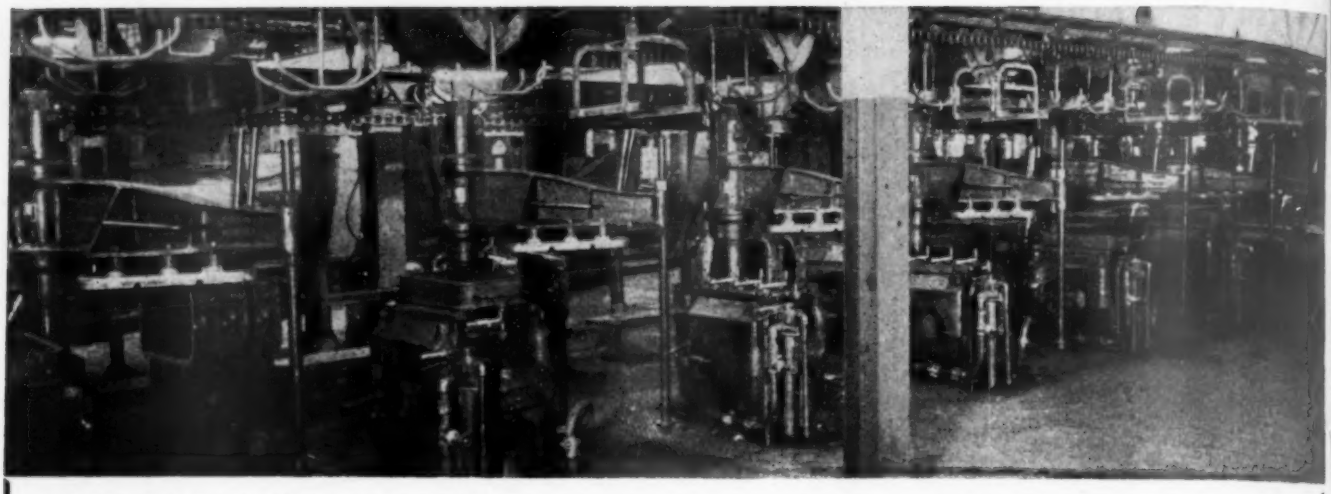
Distinguished Service

"CAST in a vital role for victory" may well describe the part that American Foundries have played in World War II.

Throughout the war more than 5000 metal founders—including sand, plaster, permanent mold, die-casting, centrifugal, etc.—have worked 24 hours each day to produce millions of castings used in America's war weapons.

Federated is proud to salute every individual in the Founding Industry for this remarkable production achievement. And proud, too, that since the beginning of this war, it has supplied nearly two billion pounds of Federated non-ferrous metals to the founding and other American industries.

ONE OF A SERIES OF ADVERTISEMENTS DEDICATED TO THE PRODUCTIVE ROLE OF AMERICAN INDUSTRY IN WORLD WAR II

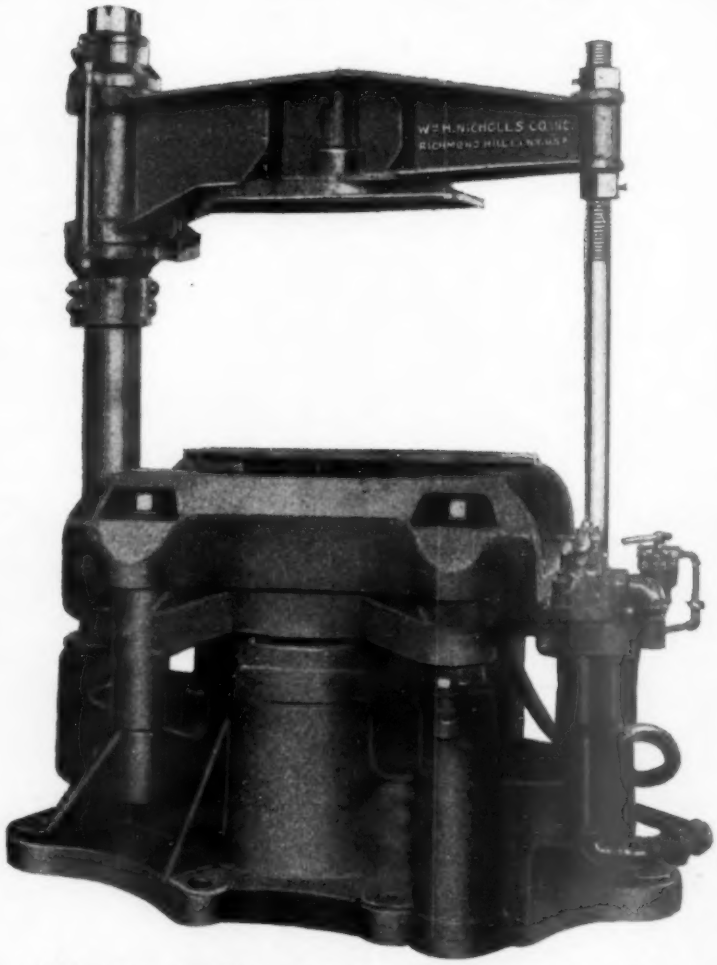


A Battery of Nicholls 16" Heavy Duty Machines

Nicholls' Molding Machines

Preferred by the Largest Foundries..

REDESIGNED to a minimum of working parts; thereby greatly reducing maintenance cost and, at the same time lowering operating costs through the saving of labor. The crossarm is equipped with a parallel squeeze plate which considerably reduces the amount of crossarm travel; resulting in faster operation and less effort required. The open end frame allows for flexibility in pattern lengths. Quick acting, yet so simple to operate that unskilled labor can be taught to make molds in record time.



#18-44 Type "K" Heavy Duty Jolt Squeeze and Pattern Draw Molding Machine, with open end frame and parallel squeeze plate, 18" diameter squeeze piston and 8" diameter jolt piston.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL, LONG ISLAND, NEW YORK

Established 1910

Foreign Manufacturers and Selling Agents—
For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland

NICHOLLS

FINDING BETTER WAY TO DO THE JOB

(*Concluded from page 87*)

Fig. 12 shows the revised method of shearing castings. Here the operator, who is now a female employee, is grasping the castings from a storage hopper which is serviced by use of the hi-lift truck and dump box. Notice that the operator is working in an upright position with a constant flow of castings in a convenient and accessible position for getting the rough stock and disposing of the finished material. The reduction in fatigue of this job, as well as many others in the finishing department, has enabled the use of female employees. Note that two boxes are available for the disposing of the finished parts; while one box is being filled the other is being transferred to our finished storage, thus eliminating the loss of productive time for changing of loads.

Fig. 13 shows the former method of counting castings for shipment, from one tote box to another. All castings are counted and weighed for shipment. It will be noticed here by the position of these employees that they were in a fatiguing position and that this job would not be desirable to many individuals.

Fig. 14 shows the revised method of counting castings for shipment from what is known as the counting hopper. These castings are completely finished and ready for shipment. Whereas the castings were formerly thrown from one box to another, this hopper facilitates merely sliding the castings from the lip of the hopper into the box, thus reducing almost entirely all of the fatigue and making the job desirable. After these finished castings are counted, they are dumped by means of truck into box cars, gondolas, or trucks for shipment.

The foundry industry should constantly strive to reduce fatigue and improve working conditions. We feel that there is little justification for doing an operation with a fatiguing method when, through the application of better methods and motion study, an easier and less fatiguing method can be devised. The better methods department should always be seeking a better way to perform all operations with a minimum amount of effort and motions, which will reduce fatigue and improve working conditions, resulting in more harmonious relations between employers and employees.

The Labor Relations Institute, 1776 Broadway, New York 19, has compiled a "Checklist on Reconversion Personnel Practices," containing 152 questions which confront management during the change-over period. The 28-page list covers wage and salary stabilization, manpower utilization and collective bargaining. It is priced at $1.

SCHRAMM OFFERS THESE
Exclusive
COMPRESSOR-ECONOMY FEATURES

Four features make Schramm Air Compressors ideal for industry. They are: (1) 100% water cooled (2) compact—lightweight. (3) mechanical intake valve (4) forced feed lubrication. These features enable you to do your job quickly, easily, economically.

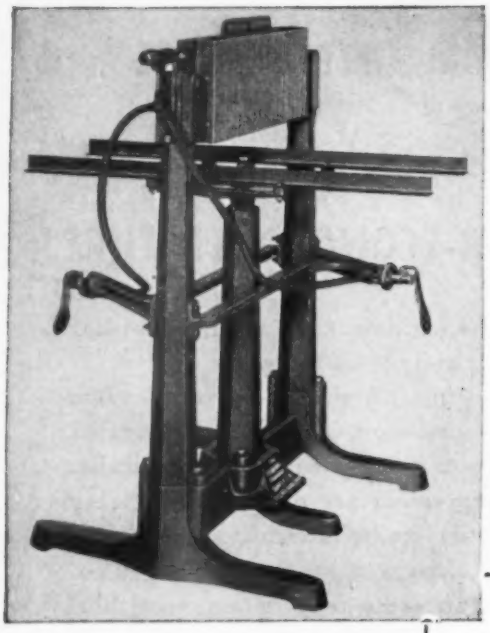
Schramm Compressors are designed for heavy duty, continuous service, with minimum attention. They are built in sizes ranging from 20 to 600 cu. ft. displacement, in every type of mounting and assembly.

Other Schramm features include long life discharge valve, and smooth, vibrationless operation. Make your compressed air job *easier* by using Schramm. Write today for details in FREE booklet just published.

SCHRAMM INC.
THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

This Stands for Honorable Service to Our Country

FEDERALS



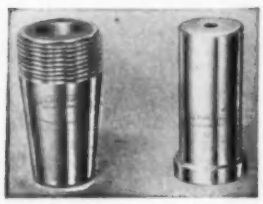
THE VIBRA-DRAW CORE DRAWING MACHINE

The ideal machine for drawing more cores and better cores than you've ever had before. The separate center stand which supports the core tray is not affected by vibration of the drawing head. Core makers draw successive cores on same core tray without shaking down cores already drawn.

The VIBRA-DRAW drawing head has 100 accurately machined grooves on each side—accommodates two core makers and ensures an accurate lift for the entire height of the draw. Our new circular tells all about it—why not write for it today?

WATER BRUSH

Easy to Grip and Hard to Tip. It can't leak and one filling lasts all day. Does not tire the molder's hand.



TUNGSTEN-CARBIDE BLAST NOZZLES

Cut Cleanings Costs! Reduce Your Air Costs! Cut Shut-down Time! Clean Faster and Better! You can do all these things simply by installing Federal Blast Nozzles in your cleaning equipment. Buy and install one—prove it in your own plant.

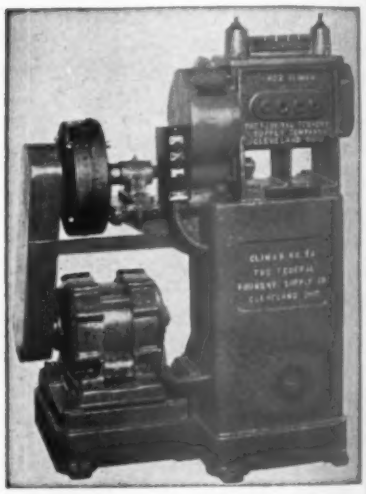
"The Twist Does The Trick"

TWISTED STEM CHAPLETS

The chaplet with everything. The "Twisted Stem" promotes rapid complete fusion. Not deformed, the stem has no weak spot to burn in and permit core shift. Made in a complete range of sizes. Samples of the size you use, gladly submitted.

CLIMAX WIRE STRAIGHTENERS

Any foundry, large or small, can cut production costs by straightening and re-using core wires and rods. With a Climax Wire Straightener this can be done quickly, economically, safely—by unskilled labor. A complete descriptive circular is yours for the asking.



All Federal Productu

THE FEDERAL FOUNDRY

Seacoal Plant
CROWN HILL, W. VA. · CHICAGO · MILWAUKEE · DETROIT · ST. LOUI HATTA

Chamberlain Co., Los Angeles, Calif. · Pacific Graphite Works, Oakland, Calif. · LaGrand Industrial Supply Co., Portland, O

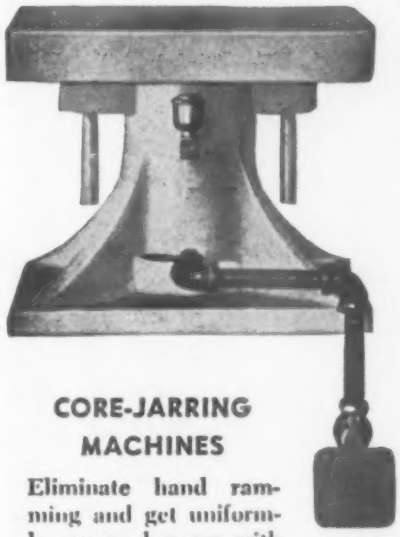
SUPPLIES

SWABS—We have eliminated the shortage of this essential item by making them ourselves. Federal swabs are made of the best flax, ample in size and won't fall apart. They're fully eighteen inches long and full-bodied. Shipped from stock — the supply is ample. Jobber inquiries are invited.

RUBBER-COVERED SHOVEL HANDLES

The best insurance you can buy against damaged patterns, core boxes or flasks. The pear-shaped grip is ideal for ramming.

They will fit your present shovels or you can order your next shovels with them already installed.



CORE-JARRING MACHINES

Eliminate hand ramming and get uniformly rammed cores with Federal Core Jarring Machines. Powered by air, these machines are sturdy and long wearing. Readily available now when you need them. The present lack of experienced labor will not handicap your shop if you have Federal Core Jarring Machines.

THE LOWE ELECTRIC SIFTER

Faster sifting, better sand conditioning combine to cut costs when a Lowe is on the job. Malleable yoke creates faster sifting; more shovel clearance permits faster loading. Enclosed ball bearing motor is a miser on current. Instantly replaceable screen bottoms. Lowe-sifted sand is better sand. The Lowe's 21-inch diameter screen bottom gives you over 10% more screening surface than the conventional 20-inch screen!

WONDER CUTTER

Users say it's worth its weight in gold. Small enough to be mounted on any bench or table, the Wonder Cutter will cut round or square rods and band iron. Priced at $39.50 f. o. b. Cleveland — every foundry should own one.

ucture Sold with Service

MEMBER

MANUFACTURERS' ASSOCIATION INC. FOUNDRY EQUIPMENT

RY SUPPLY COMPANY • 4600 EAST 71st STREET CLEVELAND 5, OHIO

LOUISVILLE · CHATTANOOGA, TENN. · ST. PAUL · NEW YORK · RICHMOND, VA. · Mines UPTON, WYO.

Portland, Oregon · Cement Sales Company, Houston and Beaumont, Texas and Harvey, La. · Shanahan's Ltd., Vancouver, B. C.

THE FOUNDRY INDUSTRY AND EDUCATION

(*Continued from page 96*)

without cost would you be interested?" 104 *responded yes;* 2 *replied no.*

In answer to the question *"Does your school have talking motion picture projection equipment available?"*, 101 responded yes; 5 no. Eighty reported they used silent projection equipment, 3 said no.

In passing it should be observed that educational institutions, certainly in foundry instructional work and perhaps in their work in other directions as well, are inclined definitely toward the use of motion picture equipment. This suggests that the foundry industry be prepared to meet this trend through the availability of motion pictures which will carry the desired message to young men in educational institutions.

The final question under Section 5 of the inquiry was *"Would you be interested in local foundrymen lecturing to your classes?"* 76 responded yes; 17 no.

Section 6 requested information on *"How many full-time foundry or allied subject instructors are on your staff?"* The responses indicated that a total of 98 full-time instructors are employed by 52 schools. The information showed that 47 part-time instructors are employed by 35 schools.

The responses to these two questions would seem to indicate the organizations that have taken foundry instruction work seriously have come to the conclusion that informed instructors are a requisite to the success of their program. This in turn poses a very interesting question to the foundry industry. It has to do with the availability of trained individuals to instruct in foundry courses. The foundry industry would seem to be well advised to be giving thought to the development and completion of a program which will insure the availability of qualified foundry instructors if and when educational institutions require them.

Section 7 of the form asked *"Describe how we could assist by interesting local plants in your problem."* Table VII details the responses received to this section of the inquiry.

Looking to the future the question was asked *"Will your school sponsor courses for service veterans?"* Eighty-four advised yes; 2 no. This was followed with the inquiry *"If yes, Day"* to which 77 responded affirmatively and under *"Evening"* 27 responded yes. Five institutions were uncertain and 9 planned to include some provision in this regard in the regular part of their curriculum.

The final question of the study was *"What other suggestions do you have as to how we could assist?"* Table VIII gives detailed information on the responses received.

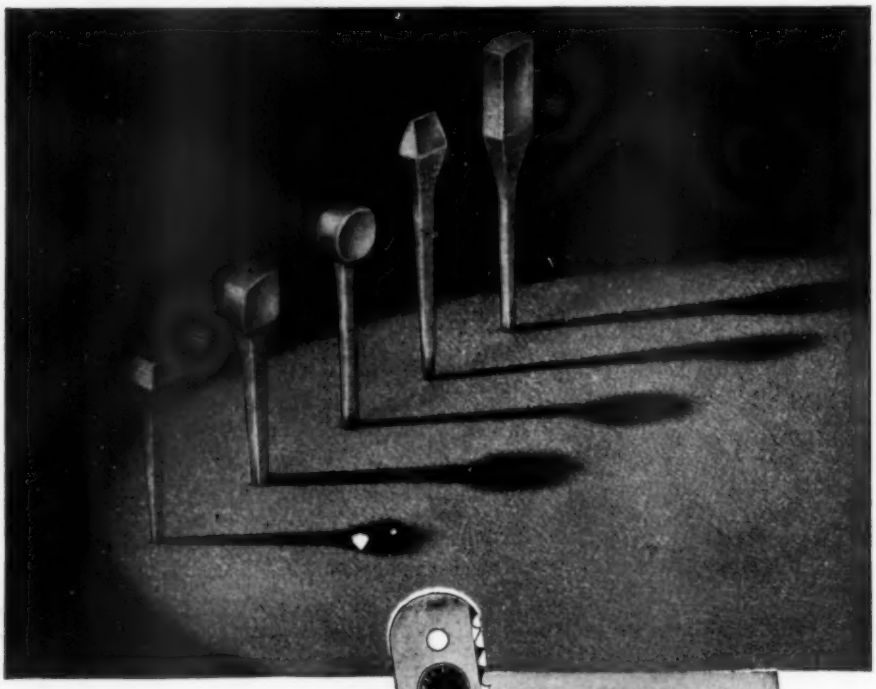
It will be noted that the desire for equipment and advice as to its availability heads the list of the responses under this return. The next in importance is giving information on latest developments, literature on new equipment and advertising material for student use. This is encouraging as it shows the desire to use up-to-date and modern material. Third in importance is help desired in securing teaching aids, and fourth is the desire for suitable motion picture equipment.

At this time when reconversion is occupying the attention of so many individuals and when local and regional foundry groups throughout the country are giving attention to the specific subject of closer co-operation with educational institutions, the facts set out in the study initiated by the Foundry Equipment Manufacturers Association carries some extremely interesting results.

PRESENT FOUNDRY FACILITIES AND FUTURE NEEDS OF INSTITUTIONS

1. Interested in securing foundry equipment for apprentice training and trade extension.
2. Floor space available to teach sections of 15 to 20 men. However, proper equipment is needed, especially control instrument and a good representation of basic equipment.
3. Foundry consists of two small gas fired crucible furnaces, four small flasks, sand bins and working space. We wish to enlarge this to a complete small-scale foundry as soon as possible.
4. Cupola 20 in.; electric furnace 40-lb ca-

(*Continued on page 212*)



For Sound Castings

SMOOTH and CLEAN
CAPEWELL CHILL NAILS

They are *cold rolled* from the finest soft iron. The Capewell line is the most complete — with nails for every purpose and every size of casting. *Samples and prices promptly sent on request.*

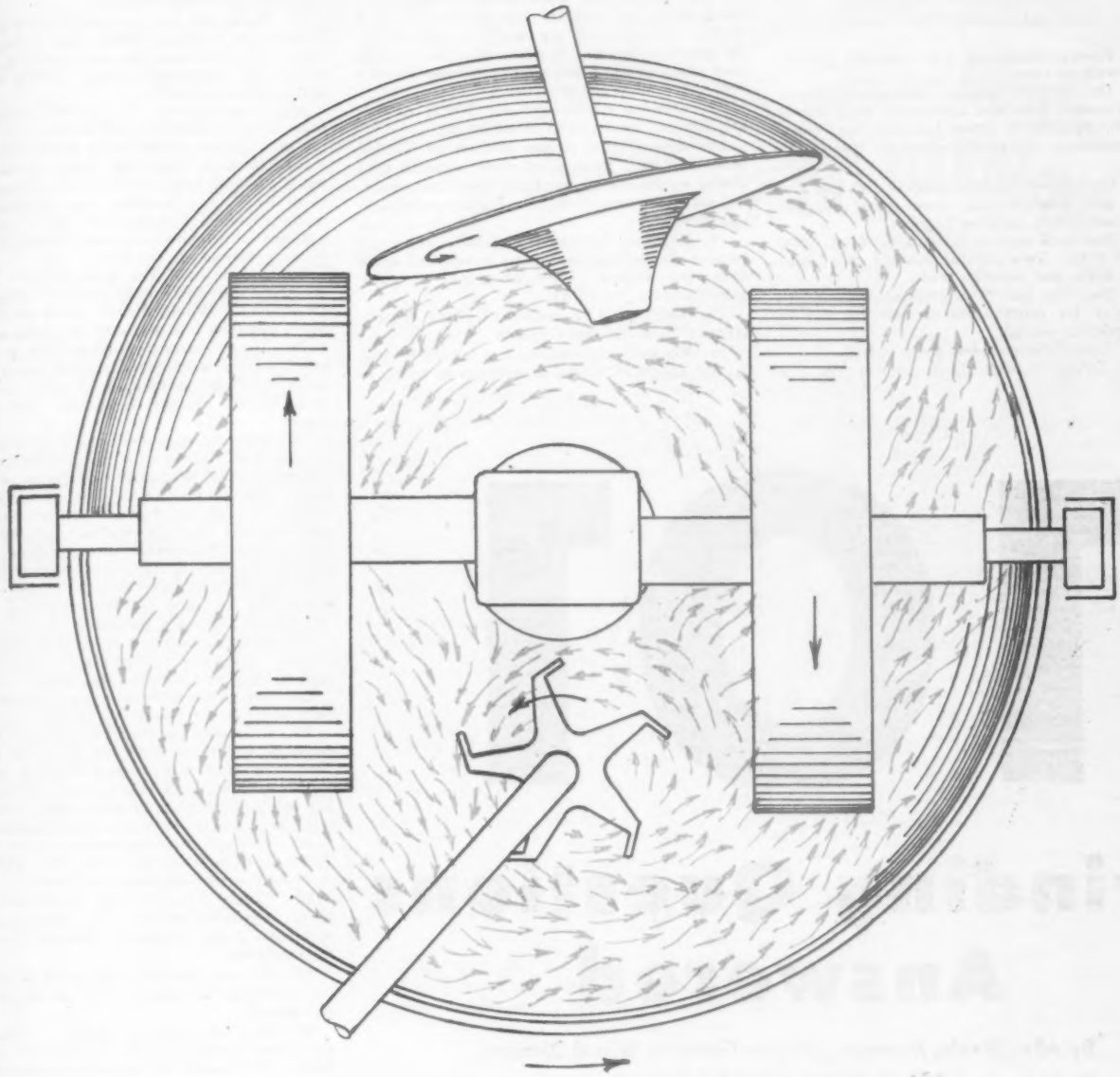
THE CAPEWELL MFG. COMPANY
Hartford, 2, Conn.

TECHNITE

CAPEWELL
HACK SAW BLADES
Cut Costs and Cut Time

The Capewell method of heat treating provides you hack saw blades that cut faster and last longer. Test them yourself, on your toughest job. Order from your mill supply man.

CAPEWELL
CHILL NAILS • HACK SAW BLADES



FAST, THOROUGH MIXING

is what you get with the centrifugal force generated by *revolving the container,* as indicated by the red arrows in the diagram above.

Let us explain in detail the **advantages of** the CLEARFIELD Mixer in preparing all types of foundry sands.

MEMBER
MANUFACTURER'S ASSOCIATION, INC.
FOUNDRY EQUIPMENT

CLEARFIELD
MACHINE COMPANY
CLEARFIELD
PENNSYLVANIA, U. S. A.

(*Continued from page 210*)

pacity; metal pot furnace 16-in.; crucible furnace.

5. Postwar buildings will probably include some work in foundry.

6. One 250-lb, 3-phase Lectromelt; 2-ton crane; casting floor and equipment; sand testing equipment; 1500-lb steam hammer; heat treating equipment. All small commercial size equipment.

7. One 350-lb Detroit electric furnace, one small gas fired furnace, core oven, Simpson sand conditioner, molding benches.

8. One small melting furnace, oil fired, 1800 F, soft metal. Two molding benches, small supply of flasks and molder's tools.

9. Capacity for 600 students. Plans are underway for construction of new foundry in early postwar period.

10. Would like complete 2-ton unit.

11. Equipped with 24-in. cupola, crucible melting furnace and usual necessary equipment for molding, coremaking, cleaning; also for sand testing. Future needs are chiefly as listed under (3) plus new building or other space for foundry (and other metallurgical work) if present foundry building is used for other work.

12. One-ton cupola and one 500-lb electric arc furnace. Feel a need to modernize.

13. Area 4000 sq ft. Size of class 20. Needed small induction furnace for steel; increase sand testing equipment; rotary table sand blast; molding machine; core oven, temperature controlled; sand blender.

14. Capacity 12 men per section. Have pot furnace for melting nonferrous metals and small homemade cupola. Have no power or automatic foundry equipment.

15. Very small in connection with Department of Buildings and Grounds.

16. We have plans for such a laboratory and are working with AFA and industry in trying to establish laboratory facilities.

17. Equipped with material testing machine, microscopes, hardness testers, sand testing equipment. Have facilities for sand molding, permanent mold, centrifugal casting, melting cast iron and nonferrous metals.

18. Accommodate 12 students, anticipating more space for students and equipment. Casting cleaning equipment and other equipment.

19. Have a 1-ton and ½-ton cupola, three small gas fired brass or aluminum furnaces, two core ovens, one tumbler, one sandblast, one muller, numerous flasks of various sizes, one jolt-squeeze machine, nine steel molders benches, ½-ton overhead electric hoist.

20. Have three gas fired crucible furnace melting nonferrous metal only, accommodating 16 students. Would like to install electric furnaces and melt iron and steel in addition.

21. Very inadequate. Would like to have a small cupola with controls, small sand mixer, small molding machine, small core oven and some casting cleaning equipment and a small crane.

22. Eighteen students, capacity of laboratory, at one time. General foundry laboratory and foundry control laboratory includes x-ray equipment. The general laboratory contains 1-ton cupola, one electric furnace, one gas fired crucible furnace, molding machine, casting cleaning equipment, portable oven, and other miscellaneous foundry machines and equipment. The control laboratory includes a full line of equipment for sand analysis, chemical control equipment and x-ray apparatus.

23. Foundry building 36 x 75 ft with 2-ton cupola. Need electric furnace for steel melting and molding and testing equipment.

24. We use our foundry as a laboratory as well as for foundry practice.

25. Comprises facilities for classes of 24 students at one time; 8000 sq ft; 32-in. cupola, Detroit electric furnace and crucible furnace; sand machines, sand mixers, core ovens, cleaning equipment, much of which is 20 years old and needs replacement and modernization.

26. One-ton traveling crane, 22-in. cupola, 1200 sq ft molding floor for iron, 450 sq ft molding floor for aluminum and brass.

27. Capacity for students 10 to 12 at one time, depending on available floor space for molding. Added capacity obtained by using foundry often.

28. We are definitely interested in developing a program in foundry practice for the postwar period.

29. Have laboratory for course in "Founding and Patternmaking" with capacity for 20 students. Will need to replace equipment soon.

30. Laboratory 50 x 104 ft, capacity 50 students. Equipment includes bench molding equipment and aluminum flasks, molding machines, drawer-type core oven, pit furnace, cupola, small arc melting furnace, tumbling mill, sandblast. Future needs include rearrangement of equipment and space, new melting equipment, new molding machines, sand testing equipment, equipment to demonstrate sand handling, sand conditioning, and sand control.

31. Equipment includes one Whiting cupola, 22 in.; two crucible furnaces; one core oven; one molding machine, sand testing laboratory, pattern and flask equipment for class of approximately 25. Need additional molding machines, flasks, induction melting furnaces, new core oven, and additional cleaning equipment.

32. A capacity of 24 students per section when additional equipment is added.

33. Have 20 in. Whiting cupola, Campbell-Hausfeld crucible furnace and gas fired aluminum furnace, molding floor 36 x 48 ft.

34. Have No. 1 Whiting cupola, 100-lb crucible oil fired furnace.

35. Capacity now eight students for several weeks each on a rotating basis. This will do us for the next five years.

36. Small cupola, flasks, core oven, etc., available.

37. Foundry laboratory includes 2-ton capacity cupola, ladles, flasks, one gas melting furnace of small capacity, a core oven, and pattern shop.

38. We have small gas furnace, some patterns and flasks, a core oven and core molds.

39. Our present equipment limits us to brass and aluminum.

(*Concluded on page 214*)

101 Grinding Questions Answered

By Allen Steele, Manager, Dayton Grinding Wheel Division
SIMONDS WORDEN WHITE COMPANY

Now in its second edition . . . 101 answers to many of the more common grinding problems . . . indexed for quick, easy reference. Sent without cost to anyone interested in better grinding practices. Just fill out and mail the coupon below.

COPYRIGHT 1945
SIMONDS WORDEN WHITE CO.

Get Your FREE Copy Today

DAYTON GRINDING WHEELS

SIMONDS WORDEN WHITE COMPANY
719 Negley Place, Dayton 7, Ohio

Please send me free booklet "101 Grinding Questions Answered"

Name_____

Firm_____

Address_____

City_____ Zone_____ State_____

At TUBE-TURNS

Heat Treating Forged Aluminum Cylinder Heads CONTINUOUS OPERATION...WITHOUT HANDLING

. . . a big job done in ONE operation with

ROSS Continuous Aluminum Heat Treat Ovens

Automatic Heat Treating, quenching, aging and stress relieving the 66 lb. forged aluminum cylinder heads at Tube Turns, Inc. involved problems of heat distribution and timing that only the most carefully engineered equipment could solve.

Six modern ROSS OVENS, with separate ROSS Heaters supplying hot air to the major heating zone of each oven are doing this job.

Whatever the problem—weight of load, time schedule or uniformity of product—leading producers consistently specify ROSS OVENS to insure the right results.

Equally outstanding for their performance are the ROSS COMPARTMENT OVENS such as have been installed for leading concerns — Chrysler, Pratt & Whitney, Chevrolet, Packard — to mention but a few.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORP.

DESIGNERS AND BUILDERS OF AIR PROCESSING SYSTEMS

350 MADISON AVE., NEW YORK 17, N. Y.

ROSS CONTROL OF AIR FOR MODERN INDUSTRY SYSTEMS

201 N. Wells St., Chicago-6 • 79 Milk St., Boston-9 • 12953 Greeley Ave., Detroit-3 • 1709 W. Eighth St., Los Angeles-14

ROSS ENGINEERING OF CANADA, LIMITED — Dominion Square Building, MONTREAL, P. Q.

CARRIER—ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

(*Concluded from page 212*)

40. Might be interested in adding magnesium alloy capacity.

41. We need to start from scratch and build a complete laboratory foundry.

42. Have bench molding facilities for 12 students, portable squeezer, gas fired furnace for No. 40 crucible, core bench, core machine, core oven.

43. We have the space but no equipment.

44. Very small but we are able to teach the fundamentals.

45. Have a small crucible for aluminum and brass for use in our metal shop.

46. Planning to offer work in metallurgy particularly of iron and steel as soon as practicable.

47. Laboratory is 80 x 60 ft with an L 30 x 80 ft. A 20 ft traveling crane runs along the one side of the laboratory (60 ft). Equipment is as follows: One squeezer type molding machine; one turnover type molding machine, small; one jar type molding machine 18 x 24-in. bed; one striping plate type molding machine, small; one gas fired crucible furnace for aluminum, 20 lb; one crucible furnace for brass, capacity 100 lb; one cupola 32 in. inside diameter; one sand testing laboratory; one tumbling barrel; one muller type sand mixer.

48. We have a 21-in. Whiting cupola, a natural gas fired furnace handling 75 lb crucibles for melting brass and aluminum. Need more steel flasks, a muller and sand testing equipment.

49. We do a few experiments in making simple molds and pouring with lead.

50. Have no suitable space for foundry. Might be able to arrange space for melting nonferrous metals.

51. Have a tilting crucible and can pour nonferrous metals and alloys. Have a very large iron cupola, entirely too large for economical use. Need a small iron foundry.

52. Molding (hand or bench) for six but need

IT'S STARING YOU IN THE FACE!

THE ANSWERS TO ALL YOUR FOUNDRY BELT PROBLEMS . . .

Put SAHARA BELTING on your hot sand elevators and conveyors and REXALL on cold sand and castings . . . then whatever worries you may have, BELT TROUBLE WILL NOT BE AMONG THEM!

IMPERIAL BELTING COMPANY

1750 S. KILBOURN CHICAGO 23

12. Have steel shot blast rattler for cleaning, electric riddle, 90-lb gas fired crucible furnace. Need larger capacity.

53. One is being planned at present for postwar use.

54. Foundry floor space is 2880 sq ft; sand testing laboratory 780 sq ft; core room and storage 2880 sq ft. Have 22-in. cupola, 3 molding machines. Need electric furnace, sand mixer, some sand testing equipment, core oven.

55. Are equipped to instruct about 20 students at one time. They receive instruction in molding, coremaking, melting (cupola, electric arc and crucible) and cleaning operations. Also sand and metal testing procedures.

56. Have 18 work stations, a 26-in. cupola, and nonferrous melting furnaces.

57. We have a one-ton cupola, but need more modern equipment.

58. Have a cupola and four small furnaces, a floor capacity to take care of 25 students at one time, 200 students per quarter.

59. Small muffle furnace, gas fired, suitable for melting brass and aluminum available.

60. Have a small furnace and other necessary equipment for elementary foundry work.

61. Have not believed that under the conditions here, where we are located in a great foundry center, a laboratory foundry is necessary. Our men do have connections with and may work out problems of metallurgy and practice at local plants.

62. We cover various molding operations. Do not use cupola. Expect to build new laboratory in near future.

63. Are planning a larger unit. Will build separate foundry building in near future.

64. We plan to equip a complete small foundry with an electric arc furnace if possible.

65. Have 1 to 1¼-ton cupola 18 in. design, and one Campbell-Hausfeld brass melting furnace.

66. In changing buildings our original foundry equipment was dismantled, some disposed of and some retained.

67. Have one No. 30 cupola; one core oven and car, one brass furnace, as well as ladles, flasks, hand tools, grinder, and tumbler.

68. Have a small Whiting cupola, 60-lb electric furnace and 60-lb nonferrous furnace. Floor space 30 x 60 ft. Homemade benches.

69. We hope to expand and are thinking of metallurgical and foundry laboratories for the future.

70. Operate a small foundry for brass.

71. Have Whiting cupola No. 1.

72. We installed an electric furnace and foundry in cooperation with NYA, but when it disbanded, all equipment was disposed of so now we are starting from scratch again.

73. Have equipment for melting cast iron and nonferrous metals. Molding equipment is also available and testing equipment for testing castings and cores.

74. Furnace equipment consists of 14-in. cupollete, Iler brass furnace and 10-lb Detroit electric furnace. Do not have sandblast equipment. Have a permeability tester, but no other sand testing and handling equipment. Have small assortment of flasks and one mechanical squeezer.

75. Have little or no molding equipment, no facilities for coremaking, no sand and other standard foundry testing apparatus. Willing to open up new room to be devoted exclusively to that kind of work. Feel that we are well equipped in accessory equipment necessary for founding work. For example, we have all of the regular hardness testing equipment including brinell, Rockwell, scleroscope hardness testers; extensive metallographic equipment including a Bausch-Lomb research metalloscope, an x-ray defraction unit, a Baird 30,000 line grating spectograph, an induction melting furnace, an arc furnace, and other miscellaneous melting equipment; adequate control equipment including five automatic temperature controlling devices and two Leeds & Northrup micromax six-point recorders.

Centrifugal Castings Co., Bluffton, Ind., plans construction of plant and office, machine shop and fabrication department buildings, 120 x 125 ft., to cost approximately $150,000.

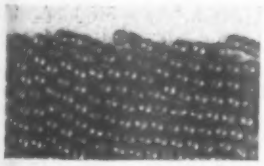
Important Questions to users of metal cleaning abrasive

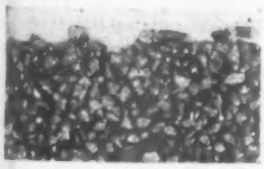
WHAT SIZE of cleaning abrasive do you use

HOW LONG does it hold to that most effective size

IT will pay you to check up at once, and if not already our customer, be sure to try—

20th CENTURY SHOT BLAST GRIT





This cleaning abrasive is amazingly durable due to our exclusive scientific heat treating process. When you buy a size for a certain class of work, you can depend on it to hold to that size range longer and insure top cleaning speed and efficiency.

20th Century Blast is made in many different sizes accurately graded to new S.A.E. Specifications. Tell us the nature of your work and we'll gladly assist you in the selection of the right size to do your job right.

IMMEDIATE SHIPMENT

Our unexcelled manufacturing facilities enable us to make shipments at once in any quantity.

Write for free samples and price list.

The Cleveland Metal Abrasive Co.

Main Office and Plant: 880 East 67th Street, Cleveland 8, Ohio

Howell Works—Howell, Michigan

WASHINGTON *Notes* ★★★

SPEED of reconversion is difficult to measure, but WPB officials say their studies indicate the about-face to peacetime pursuits so far has been faster than expected. The rush of workers to apply for unemployment compensation, while regarded as only temporary has clouded the picture somewhat; it has also been paradoxical in certain respects in view of the thousands of jobs waiting to be filled in some industries. For instance, gray iron foundries require at least 45,000 additional workers, according to Walter L. Seelbach, president, Gray Iron Founders' Society, in testifying recently before the Senate finance committee.

★ ★ ★

Meanwhile, WPB is showing a determination to hand the ball over to business and close up shop as soon as possible. Most of its regulations have been abolished, and a simplified system of priorities now is in effect. The only ratings left are AAA, which is the top priority; MM applying to military supplies, and a new CC rating to be used sparingly and then only to break a serious bottleneck in reconversion. The former AA rating is out the window, and old purchase orders carrying that symbol have no preference standing after Sept. 30.

★ ★ ★

BUSINESS men who have become dependent on priorities as a means of obtaining material or equipment, are being told by WPB that they must learn to go out and find what they need without preference ratings, that most items will be in adequate supply soon and can be located with a little digging. Certain items, of course, still are scarce and will remain tight for some time; regulations covering their use will continue in effect.

★ ★ ★

Tin is the sorest spot in the supply picture. Teams are in the Pacific area to expedite shipment of any stocks found there, but considerable delay is certain to occur before anything approaching a normal movement from the Far East can develop. While we entered the war with a relatively good stock of tin, that supply would be exhausted by the end of 1946 unless supplemented by additional receipts before then. Other scarce metals are antimony and lead, but the situation in both is only temporary and less serious than that in tin. Hard fibers remain tight, but relief will come as soon as shipments from the Philippines can be stepped up.

★ ★ ★

LUMBER again is in reasonably good supply, Army cutbacks having helped materially, and this item should prove no obstacle in substantial expansion of building construction. The fact that several other building materials still are short, however, has prompted retention of certain controls over building activity, although the principal reason for holding onto the check rein is to avoid an inflationary building boom. Production of cast iron soil pipe, brick, clay products and certain other commodities must be increased considerably to support a full-scale building program.

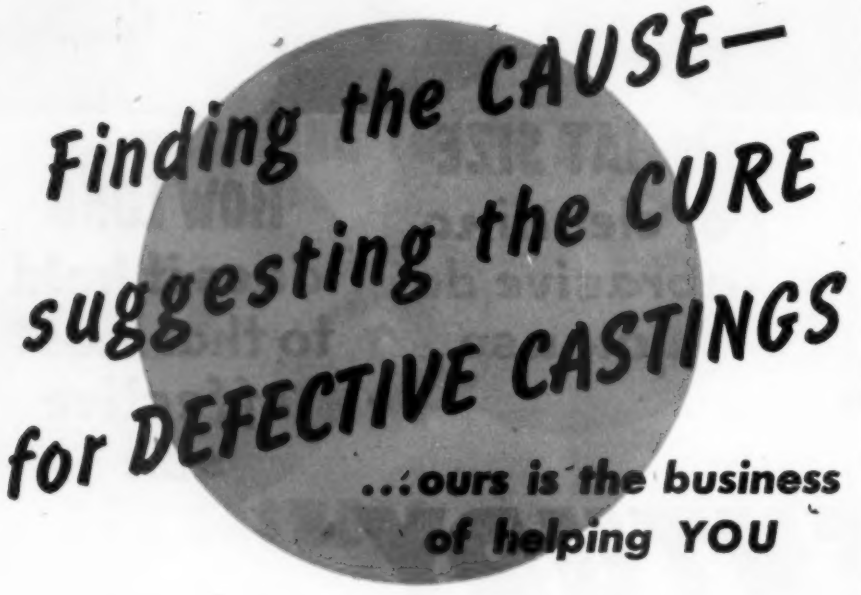
★ ★ ★

Recent changes in industrial construction controls permit various forms of building to be undertaken without WPB authorization. Included among the types of industries for which such work is permitted are mining, smelting and refining, foundries and other operations related to extraction of minerals and their conversion to finished form.

★ ★ ★

SOLID Fuels Administrator Ickes still maintains that coal needs of industrial groups were reduced very little by Japan's defeat and that the country's requirements will be so great that it will be difficult if not impossible to meet them with available mine manpower. He places total needs at 585 million tons for the fuel year

(*Concluded on page 218*)



KAWIN SERVICE includes advisory and consulting assistance on every phase of general foundry practice. We invite your inquiries.

LABORATORY SERVICE

Our laboratories offer you prompt and accurate service on chemical and physical testing of all ferrous and non-ferrous metals, sand, coal, coke, fluxes, etc.

SERVICE TO FOUNDRYMEN SINCE 1903

KAWIN

Chemists FOUNDRY ENGINEERS *Metallurgists*

431 So. Dearborn St.

CHICAGO *(5), ILL.*

BUFFALO LABORATORIES—110 PEARL STREET

What type of

CORE BINDER

do you prefer?

DRY CORE BINDER?

Houghton is a pioneer in this type . . . has two proven binders: Hy-Ten 100 for non-ferrous castings, Hy-Ten 250 for grey iron and steel. Dry binders are accepted today as filling a definite place in core-making, because of ready collapsibility, reduced baking time and lower cleaning costs.

POLYMERIZED OIL?

Based on mineral polymers which are polymerized under the heat of baking. A volume product since war production began . . . high-tensile-strength uniform cores with minimum gassing and good surface finish. This type was the leader of the 1940-45 foundry era, and is still widely used by both the ferrous and non-ferrous foundries.

LINSEED OIL BASE?

Houghton has this type, too, for the foundry which still believes linseed to be the best type for cores. Not new, but good! The open-minded foundryman who is alert for new ideas will, however, want to investigate more recent developments to see how they may improve his shop practice and reduce rejects.

NEW THERMO-SETTING OIL?

A brand-new development in HY-TEN Core Oils, combining the advantages of "non-oxidizing" polymerized oils with a new ability to bake through, at comparatively low temperatures. Shake-out ability definitely improved, smoking and gassing further reduced, better surface finish. This HY-TEN 10-to-70 Series is Houghton's contribution to post-war foundry processing.

Houghton Foundry Service thus includes products representing a cross section of all preferences for various types of core binders. The plus value of the personalized service to help solve core problems should also be borne in mind. Ask the Houghton Man!

E. F. HOUGHTON & CO.
303 W. Lehigh Avenue, Philadelphia 33, Pa.
Service and sales in all principal cities

Houghton's **HY-TEN** *covers the field...*

(*Concluded from page 216*)

ending next March 31 and says the mines probably will be unable to obtain enough men to produce 575 million tons.

★ ★ ★

Synthetic grades will continue for some time to be our chief source of rubber, and as yet there is no accurate information on how soon or in what volume crude rubber will be flowing here from territory recently held by the Japs. In 1940 we consumed 650,000 tons of crude rubber. This year's consumption of crude and synthetic is estimated at 850,000 tons, and for 1946 it is placed at 940,000.

★ ★ ★

SETTLEMENT of war contracts is proceeding smoothly, and the bulk of fixed priced contracts are expected to be settled by the end of the year. The key to speeding up contract settlements is for contractors to file their claims promptly. Until sub and sub-sub contractors file their claims with their next higher ranking contractor the top prime contractor cannot make these settlements and file his own claim. Claims of subcontractors involving less than $1000 can be settled without authorization, while similar action is authorized in some cases on claims of less than $10,000.

★ ★ ★

Smaller War Plants Corp. is continuing to make loans to small plants for civilian production, end of the war not affecting the agency's power in this respect. In the three years SWPC has authorized financial assistance to small plants it has made available more than $333 million in loans and machinery leases.

★ ★ ★

OPA has authorized an increase of about 8½ per cent in manufacturers' ceiling prices for cast iron tube radiation. In another recent price action ceilings were established on sales of "short orders" of high alloy castings. This involves orders with shipping weight of 75 lb or less. No specific price schedule previously was in effect on such sales and many sales were made at a loss.

★ ★ ★

Price control has been dropped on primary aluminum ingot, primary and secondary magnesium, magnesium scrap and most aluminum castings, magnesium castings and die castings. Scrap and secondary aluminums are not affected. On the other items supply has come into reasonable balance with demand, OPA stated in explaining its action.

★ ★ ★

GERMAN industry, paralyzed for many weeks, is showing first signs of revival, according to reports from the American occupied zone. As of Sept. 1 local manufacturing was up to about 25 per cent of the 1944 rate. Surprisingly enough, 1944 production was only 4 to 5 per cent below that of the best prewar years. This may be explained partly by the fact that bombing was concentrated on strategic targets; for instance, textile plants were passed up in favor of aircraft factories.

★ ★ ★

The German food situation in the American area is better than was expected a few months ago. Normally 75 per cent sufficient through the food the zone raises, the percentage was only 25 to 30 on June 1 but now is nearly 60. Fuel and transportation are major problems. Just prior to the German surrender coal miners were largely displaced persons from occupied countries. When the Yanks arrived these workers quit, and the former German miners are reluctant to return to the pits. Railroads still are in bad shape but have been restored sufficiently to handle most of the limited volume of traffic available.

★ ★ ★

THE AVERAGE German industrialist is reported anxious and ready to resume business. Officials of one large plant had prepared for the Americans an elaborate display of its manufacturing processes and products it was capable of making. All of the products represented items that could be used by the occupying army; and the display itself had been made and carefully stored 6 months before Germany surrendered.

W.G.G.

Whiting Corp., Harvey, Ill. has concluded arrangements with the British Cast Iron Research Association for the exclusive rights to manufacture and market balanced blast tuyeres for cupolas, as previously supplied by the McWane Cast Iron Pipe Co., Birmingham, Ala.

NEW STANDARDS of SERVICE

THE unprecedented demands of the war just ended set new standards of production for all of us. During that period our record of service to the foundry industry reached new heights of efficiency. And yet, even under the war's constant urgency, we found time to give each transaction that close personal attention which, with Hickman, Williams, has always made *an "order" an obligation to serve helpfully.*

You'll find us willing and ABLE to help you with whatever problems you may have, dealing with Ferro Alloys, Pig Iron, Shot, Grit, Fluorspar, Coal and Coke.

We shall appreciate the opportunity to demonstrate how we can serve you efficiently and, equally important, *helpfully.*

Just tell us when to call—we'll be there.

Hickman, Williams & Co.

(INCORPORATED)

CHICAGO · DETROIT · CINCINNATI · ST. LOUIS · NEW YORK
CLEVELAND · PHILADELPHIA · PITTSBURGH · INDIANAPOLIS

ASK MAEHLER CORE OVEN USERS

...how Maehler Core Ovens materially reduced operating costs!

There are good reasons for the enthusiasm of Maehler core oven users. The ability of Maehler ovens to lower costs and increase production has been proved *on the job* in modern foundries of every type. The Maehler re-circulating air heat principle shortens baking time, assures perfect heat uniformity, gives you more perfectly baked cores, eliminates green or burned cores.

Why burden yourself with inefficient, costly, old-fashioned methods of core baking? Why not let Maehler help you bake more, better cores, faster, with less expense.

Maehler core and mold ovens are available in a complete range of oil fired, gas fired and electrically heated units. A Maehler engineer will be glad to go over your core baking problems with you. Write today.

THE PAUL MAEHLER CO.
2200 W. Lake Street
Chicago 22, Ill.

93.6% of all our orders are repeat orders!

MAEHLER

GOOD SAND CONTROL

Produces Many Benefits

By M. H. HORTON
Moline, Ill.

SAND control is a method of eliminating one of the known variables in a modern production foundry. Its principal function is to give better castings at less cost per ton. Many benefits are not seen in the foundry itself. Machining costs and time are benefits which one will have to leave the foundry to find. In innumerable cases tool costs, tool life and loss of machining time can be traced to poor sand control.

Many complaints of hard iron by the machine shop can be traced to poor sand control in the foundry. Metallurgically the castings may be of normal composition but poor cleaning and burnt-in sand can be the cause of the hard iron complaints. Oftentimes heat treating equipment is used to anneal castings, which otherwise are perfectly normal. The result is an inferior product and loss of furnace time on other products.

Some of the other indirect benefits of sand control may be better paint adherence, better fitting castings on the assembly line and better appearing castings on the final product. The direct benefits should be less scrap, lower cleaning cost, better production, lower sand and material cost per ton of good castings.

To establish good sand control in a foundry is a difficult task but can be accomplished by good salesmanship, perseverance and results. Many times it is started in a foundry and is never carried to completion because the immediate results did not show enough advantages in the foundry's opinion. This condition can be traced to a poor job of selling and the foundry's half-hearted attempt to stay with the control long enough to realize its value.

Selling sand control to many foundry foremen is a difficult job. This is probably due to the constant pressure being exerted upon them for more production and their ability in the past to "get by" without it. They soon realize its value if sand control is practiced. A good control man will sell the foundry foreman on sand control if he will produce results. One must remember that a molding foreman usually has little time to study thoroughly the benefits.

Cannot Blame the Sand

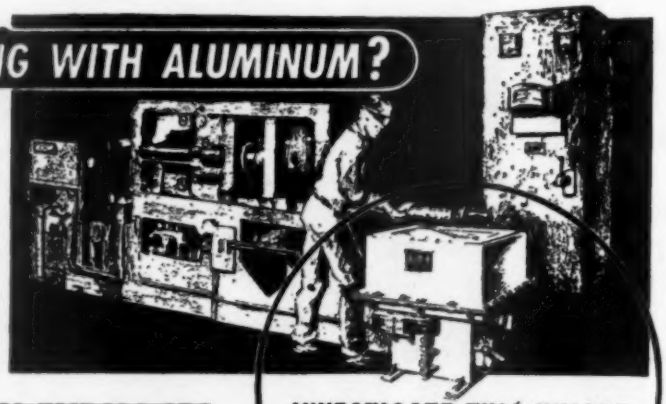
It should be the function of the man in charge of sand control to defend his findings and point out in many cases the true reason why the scrap attributed to sand should not be so listed on the scrap report. Many items, such as poor flask equipment, poor jackets, faulty shifting of weights, poor bottom boards, faulty rollers, improper gating, poor molding machine maintenance and sloppy molding, can be sources of scrap for which sand alone takes the blame.

The sand control man should analyze carefully the scrap report and correlate this data with his own. If he finds the other items are at fault he should point them out tactfully to the proper persons. In this manner he can be of great help to the molding foreman, core room foreman and mill room foreman. Suggestions properly placed are never resented by a busy foreman.

Once sand control has been established and maintained properly the benefits derived from it by all will establish its security. It is set up easily and maintained in a mechanized unit. The control practiced, however, will vary for different foundries.

Many mechanized units are handicapped in obtaining the maximum benefits of the unit due to faulty planning of the sand handling and sand preparation equipment. A good unit should consist of adequate storage space for shakeout sand. This is a very important item as it alone can determine how closely one

WORKING WITH ALUMINUM?



Typical layout for die casting, showing compact 20 KW Ajax-Tama-Wyatt furnace in position. Unit comes with complete control cubicle, as shown.

INDUCTION FURNACES MEAN A MODERN PLANT..

INVESTIGATE THIS UNIQUE HOLDING FURNACE for IMPROVED OPERATIONS and LOWERED COSTS!

In addition to the holding furnace here described, small, compact, twin-coil melting furnaces are likewise available for continuous production.

Rolling mills and foundries using Ajax-Tama-Wyatt units have *consistently* developed the highest physical properties in their aluminum products . . . with decreased gas absorption, absence of all segregation, and elimination of oxide inclusions and hard spots . . .

Clean-cut temperature control, great ease and simplicity of handling are operating characteristics. Ajax induction furnaces give you a modern plant, a cooler foundry, a better product. Significantly, too, they have been known to pay for themselves within less than six months. *Write for latest TW catalogs describing both Ajax holding and melting furnaces for aluminum!*

ADVANTAGES

- Every element of uncertainty is removed from holding furnace procedure
- Automatic, positive temperature control to within 5 degrees
- No segregation, iron pickup, or contamination — automatic stirring
- Always ready to operate — no heating up or waiting periods
- Pays for itself quickly by doing away with pot or crucible replacements
- Maintenance costs so low as to be virtually negligible
- Low operating costs — only 12 KW for holding continuously up to 400 lb.; 8 KW when covered on week ends
- Greatly improved overall foundry conditions inherent in induction melting

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

AJAX ENGINEERING CORPORATION • BOX 1418 • TRENTON 7 • N. J.

ASSOCIATE COMPANIES

will be able to maintain moisture control.

Hot sand coming to the muller has always been a problem and may be remedied partially by the new type of mulling units being installed. These units are built to cool sand as it is being prepared for molding purposes. Sand sticking in the hoppers is one of the results of hot sand. Using facing to obtain cool sand next to the pattern to avoid sand sticking to the pattern is a costly but necessary item in a foundry which has hot sand coming from the muller. If facing is not used it is often necessary to install small gas or electric heating plates to keep the patterns warm. A lot of trouble can be avoided if proper care of patterns is exercised when they are new. A clean plate and a small amount of pattern spray will sometimes offset the sticking tendency of hot sand.

Screening systems should be designed to do a thorough job of removing all foreign material other than chills, core wires and core butts. It would be quite advantageous to have a crusher to crush all fine core particles. The screening mechanism and its maintenance can determine how many patterns will have to use facing or the riddle on them. If facing and riddling can be kept at a minimum, better cost and production can be obtained.

Mechanization of fines removal should be of an adjustable type which can be regulated easily. Since the percentage of fines is governed by many factors they should be controllable, as it is a material loss to add sand to increase or decrease the permeability of the system sand.

Should Allow Proper Time

The mulling unit should be analyzed for what its peak capacity may be. All too often mulling units are too small for the demand put upon them. The increased demand results in lower mulling time for each batch of sand. Properties of the clays being used are not fully utilized, and the sea coal or other agents being added are poorly distributed. Tempering of sand with a short mulling cycle is not particularly advantageous.

Often it would be profitable if a small muller were available to make up all facing mixtures when several are needed. This permits more accurate control of all facing material. Too often facing made in the unit muller has to stand too long before being used. Complaints and scrap have been traced to this cause. Facing can be made satisfactorily in the system muller, but the flexibility of control has a much wider range with two mulling units.

Every foundry has not all the facilities mentioned and therefore has to establish its own practice. The practice and method should be designed so as to obtain the maximum results with the minimum amount of help and trouble.

The details of sand control are very numerous and constitute one of the principal reasons why sand control is hard to put over in a foundry. Small as these details may seem to a few they make for good control and results.

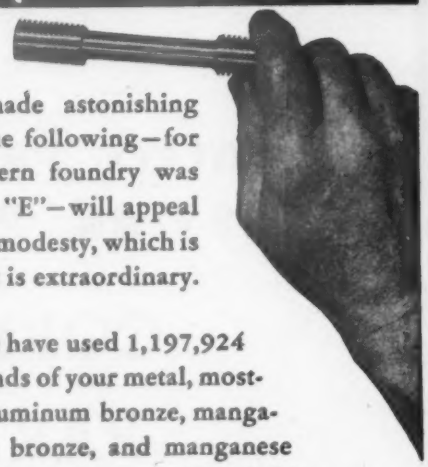
In establishing the practice the sand control foreman should consult with the molding foreman, core room foreman, mill room foreman and the inspector. The information obtained from these sources should determine the base sand, the physical properties of the molding sand, types of facing sand needed, and different core sands going into the system.

With intelligent observation a minimum number of sands can be purchased to operate the core room and foundry efficiently. All sands purchased should conform to the base sand as nearly as possible. Molding properties of the system sand should give good flowability, easy shakeout, minimum number of cuts, washes, drops, scabs, dirt, etc. This can be obtained only by constant vigilance and correlation of the molding sand properties with the scrap report and finished appearance of the castings.

Dumping of molds on a mechanized conveyor system can influence the type of sand the molder receives on his floor. The dumping of molds should be coordinated, if possible to give a good distribution and blending of the returning sand. All corrections can be made at the muller in the system but in many cases they are not, due to the demand for tempered sand and negligence by the operator.

Strict mulling and material addition control should be set up at the mulling

REJECTS BELOW 1/4 OF 1%!
A Highly Expert Foundryman reports to AJAX



Nonferrous founders have made astonishing records in the last 3 years. The following—for which this representative eastern foundry was thrice awarded the Army-Navy "E"—will appeal to all foundrymen because of its modesty, which is typical, though the achievement is extraordinary.

Send for booklet
"INGOT METALS OF TODAY"

16 STANDARD INGOT METALS BY AJAX

Ajax Tombasil
Ajax Plastic Bronze
Ajax Anti-Acid Bronze
Ajax Phosphor Bronze
Ajax Red Brass Ingots
Ajax Manganese Bronze
Ajax High-Tensile Manganese Bronze
Ajax Golden Glow Yellow Brass
Ajax Nickel-Copper 50-50%
Ajax-Hamilton Gear Bronze
Ajax Manganese Copper
Ajax Aluminum Alloys
Ajax Phosphor Copper
Ajax Silicon Copper
Ajax Nickel Alloys
Ajax Phosphor Tin

NOTE

"Proper Melting Decreases Foundry Losses," contains interesting data. Also, the booklet, "Nonferrous Ingot Metals of Today." Write for both of these. They are free.

"We have used 1,197,924 pounds of your metal, mostly aluminum bronze, manganese bronze, and manganese aluminum bronze. All of this has gone into Army and Navy material. It has been subjected to severe tests, both chemical and physical, in castings weighing from ½ to 750 lb. each. A lot of this had to stand a hydrostatic test of 7,700 lb. On this production, we feel it safe to say that our rejects have been less than ¼ of 1% due first, to your fine quality of metal, and second, to our good luck."

We are always gratified to receive letters of this character, and take pleasure in placing it among many similar ones received during our 65 years in the metal business.

AJAX NON-FERROUS INGOT METALS AND ALLOYS FOR FOUNDRIES
ESTABLISHED 1880
METAL COMPANY · PHILADELPHIA

AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting
AJAX ELECTROTHERMIC CORP., Ajax-Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
ASSOCIATE COMPANIES

unit. All additions to the sand should emanate from the control supervision. Additions of material should be made at the muller by weight or volume measuring. The additions should be made to every batch daily and will probably vary according to the patterns in production.

Sand tests should be taken as often as it is necessary to establish control. An hourly test for moisture is adequate on some units, while on others a half hourly basis is necessary. Physical properties of the molding sand may be tested in the same order or over a longer period of time.

A weekly test should be made on clay content, fineness, dry shear or dry compression strength, percentage of sea coal and hot strength. The tests can be correlated with the molding properties of the sand, the results on the scrap report and may be changed to a longer period of time if one desires. It is wise to have more information than one thinks is necessary.

The delivery of mulled and tempered sand to the molder should also be controlled. Many times complaints of dry sand can be traced to over supplying the molder on a slow production pattern. The delivery operator should be trained to recognize this item. He also can be of help in keeping the molding sand flowing properly through the molders' hoppers. Close check on these items often prevents a larger change at the mulling unit.

A daily check should be made on moisture at the mulling unit and at the molders' stations to determine the rate of moisture loss. Humidity, temperature, and sand temperature will make the moisture loss vary and enough tests should be made to establish the practice accordingly. All labor and supervision affected by sand control should be thoroughly trained in their work and educated as to why it is important to do their work as it is set up by the control supervision.

There are different methods of operating a system and maintaining sand control and equally good results can probably be attained by any one of the methods. The author prefers a synthetic base sand with a small percentage of new molding sand going into the system via facing. New sand gives the system better moisture retention. Flowability in the molding hoppers is improved and facing mixes can be varied to a greater degree. The base sand can be maintained by additions but this is seldom necessary as the cores breaking down adequately replaces sand lost.

The muller operator must have some freedom in making additions at the muller. An operator can not predict what he will receive from a dry sand shakeout hopper. Therefore, he should be instructed to recognize a batch of poor sand and how to rebuild it.

Control Increases Production

The control supervisor constantly should study the system to improve the sand handling and preparation. He can particularly help the shakeout end of the sand system by correlating dry strength and percentage of sea coal to the ease of shakeout and gas given off.

Control has proved its value in many core rooms by increasing the production through constant uniformity of the sand being delivered to the core blowers and benches.

Core sands should be controlled by establishing a mulling cycle for each batch of sand. Material, such as binders clays and core oils, should be added to the core sands according to the control supervisions findings. Materials added should be mulled dry for a short period then water and oil added for further mulling. Physical properties of core sands are changed considerably by mulling time. The advantage of mulling time should be investigated thoroughly before changing mixes or other materials of core sands.

Baking time can be reduced and the number of mixes can be kept at a minimum by close control in the core room. Sand control has to be practiced in the core room in order to maintain economical control on the molding unit. The core sands entering the system can change the characteristics of the molding sand very rapidly and should be controlled if they have that influence on the system sand.

Control of the core room will also help to establish more reliability of the cores coming from the core room. A more uniform sand and baking control of the cores is certain to improve the quality of the

(*Concluded on page 224*)

WOODISON'S

6

QUALITY PRODUCTS AID CASTING PRODUCTION

★

CORE OIL

★

PARTING

★

CORE PASTE

★

CORE WASH

★

CORE COMPOUND

★

SEA COAL

★

Woodison

THE E. J. WOODISON CO.

7515 St. Aubin Detroit, Mich.

Branches: Buffalo and Philadelphia

Get into Production Sooner!

with PROMPT DELIVERY *of*

DESPATCH CORE-BAKING OVENS

Now . . . without priorities or needless delay . . . you can get *prompt delivery* on any new Despatch core baking oven or heat treating furnace! What's more, this applies to all equipment, from the smallest Despatch batch type oven to the largest mechanized conveyor; all sizes, types, and fuels.

This means a saving of weeks or often months of costly delay. And you're assured, too, of getting ultra-modern equipment, geared to high speed, competitive peacetime work. Every unit has revolutionary new features developed during the war to provide easier handling . . . improved quality . . . increased output . . . and lower processing costs per piece.

WHY PROMPT DELIVERY IS POSSIBLE

LARGEST ENGINEERING STAFF. Consisting of picked specialists, many nationally-known, Despatch has what is probably the largest staff of engineers in the oven and furnace industry! Over 110 engineers in offices from coast to coast, plus scores of assisting personnel and two large field engineers' offices. This huge, experienced staff is adequate to handle all jobs.

AMPLE PRODUCTION FACILITIES. Using over 50,000 sq. ft. of floor space (including buildings now under construction) Despatch has unsurpassed facilities for maintaining production . . . adequate stocks of high grade materials, latest machinery, a huge supply of tools, dies, fixtures and presses, plus high-tempo, improved manufacturing methods. One of the biggest and most modern plants in the industry!

PROMPT INSTALLATION SERVICE. Your Despatch oven or furnace is not only delivered promptly, but it's installed immediately by experienced installation engineers. This service eliminates a common source of delay and assures rapid, competent assembly, coordination and adjustment.

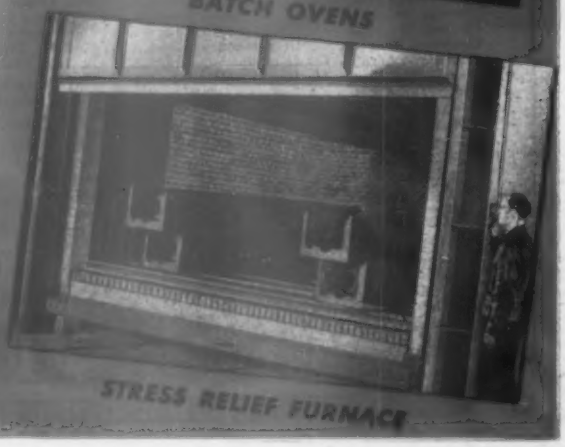
PLENTY OF EXPERIENCE AND "KNOW HOW". This means sound, usable knowledge acquired through 43 years specialized experience in this field. It saves your time, eliminates needless details, reveals sound shortcuts, reduces over-all costs . . . and gets equipment to your plant faster!

WIRE OR PHONE TODAY for further details. You'll save time, cut costs, get better results with a Despatch Oven or Furnace.

CONVEYOR OVENS

RACK OVENS

BATCH OVENS



STRESS RELIEF FURNACE

DESPATCH
OVEN COMPANY MINNEAPOLIS 14 CHICAGO 1

(*Concluded from page 222*)

cores. Control cannot be exercised in any sand system without adequate muller maintenance. Better operation and longer life can be expected from a well maintained mulling unit.

A water meter should also be standard equipment on all mulling units. Water is an important constituent in molding and core sands, and should be controlled closely. The operators should be instructed carefully in its use.

Proper training pays large dividends in a busy core room. Sand control can be practiced in any foundry if the time, effort, and training of help are carefully applied.

"White" Foundry Increases Production

ASKING a War Production Drive representative if he had ever seen a "white" foundry, the president of the American Boiler & Foundry Co., Milan, Mich., recently showed him around a brightly painted shop and said production gains had more than paid for the improvements.

The first impression of the place was that it was dark and dingy—until F. E. Ross opened the doors on an interior painted completely white except for a green border near the floor. He then produced a tonnage report showing steady gains in production during six months since the paint job that much more than covered the $9000 investment.

The gratifying results of lightening the shop walls caused the company to extend its redecorating program to the office and finally to the addition of a yellow brick surface to the exterior facing the street.

This is a direct example of the production possibilities in paint. In addition to greater efficiency through improved visibility, the psychological effects of color control have been studied widely in recent years. Hospitals, particularly, have applied the new knowledge of color psychology.

In industry, color has a definite effect on muscular activity, as well as nervous tension. When the effect of light on industrial operations became generally recognized there was a great use of whitewash and white paint in shops that had previously been dark.

During the same period, machinery was usually painted gray, although gray provided insufficient contrast to the work on which employes' eyes focused. And when they raised their eyes from the work, the white walls became a jarring influence. The improvements from greater visibility were not as great as had been expected.

Green Is Restful Color

The American Boiler plant has applied improved practice by generous use of light paint above the eye level so that a large proportion of light reflection is downward—and use of a darker, more restful shade on the walls at eye level. In this case, a band extending about 6 ft above the floor is painted green—the most restful color under most circumstances.

Some aircraft plants have, on the other hand, painted assembly room floors white to reflect as much light as possible on the under side of planes under construction.

Colors add light, warmth, space to industrial surroundings, as they are used adroitly. They help workers to focus their eyes on moving parts or other critical points. A whole range of "moving" shades has been designated, including light green, blue, red, orange and yellow hues and special whites, blacks and grays. These are used in combination with suitable complementary background shades. In contrast to monotonous gray, a non-depressing green is more widely used on machinery.—*Labor-Management News*, Washington.

Supreme Brass & Aluminum Co. is the firm name under which John Ruzzamenti, Louis Ruzzamenti, George Ruzzamenti and John R. Patterson have published a certificate that they are conducting a foundry and machine shop business at 11032 Jefferson Blvd., Los Angeles.

There's a stock of

SCHUNDLER BENTONITE

near your plant

From any one of the locations shown below . . . you can get prompt shipments of Schundler Bentonite . . . a first quality foundry Bentonite.

Akron, Ohio	Stoller Chemical Co.
Birmingham, Ala	Foundry Service Co.
Boston, Mass	Klein-Farris Co., Inc.
Buffalo, N. Y.	Weaver Materiel Service
Chattanooga, Tenn.	Ind. and Fdy. Equip. Co.
Chicago, Ill.	Foundry Supplies Co.
Chicago, Ill.	B. J. Steelman
Chicago, Ill.	Wehenn Abrasive Co.
Cincinnati, Ohio	Delhi Foundry Sand Co.
Coldwater, Mich.	The Foundries Materials Co.
Detroit, Mich.	The Foundries Materials Co.
Dallas, Texas	Barada & Page, Inc.
Edwardsville, Ill.	Midwest Foundry Supply Co.
Hammond, Ind.	The Foundries Materials Co.
Houston, Texas	Barada & Page, Inc.
Kansas City, Mo.	Barada & Page, Inc.
Long Island City, N.Y.	F. E. Schundler & Co., Inc.
Los Angeles, Calif.	Ind. Fdy. Supply Co.
Los Angeles, Calif.	F. E. Schundler Bentonite Co. (Inc. of California)
Milwaukee, Wis.	Thomas H. Gregg Co.
Minneapolis, Minn.	Smith-Sharpe Co.
Moline, Ill.	Marthens Company
New Orleans, La.	Barada & Page, Inc.
Oklahoma City, Okla.	Barada & Page, Inc.
Philadelphia, Pa.	Penna. Fdy. Sup. & Sand Co.
Portland, Ore.	Miller & Zehrung Chemical Co.
St. Louis, Mo.	Midwest Foundry Supply Co.
San Francisco, Calif.	Industrial Supply Co.
Seattle, Wash.	Carl F. Miller Co.
Tulsa, Okla.	Barada & Page, Inc.
Wichita, Kans.	Barada & Page, Inc.
Mexico D. F., Mexico	N. S. Covacevich
Montreal, Quebec, Canada—(All Provinces)	Canadian Industries, Ltd.

F. E. SCHUNDLER & CO., INC.
520 RAILROAD STREET • JOLIET, ILLINOIS

SCHUNDLER
BENTONITE

20 YEARS
IN A BRONZE FOUNDRY

MOST of the overhead Cleveland Tramrail rail system, including several transfer bridges, serving the bronze foundry of the Oberdorfer Foundries, Inc., Syracuse, N. Y., has been in continuous operation for 20 years.

The equipment serves two electric furnaces, three oil furnaces and six crucible furnaces; handles hot crucibles and delivers all metal to the molds. Despite the usual grit and dirt, present in all foundries, the maintenance required for the tramrail equipment is nearly negligible.

Recently Oberdorfer installed a new Cleveland Tramrail archbeam runway and transfer bridge on which carriers from the old system had to operate. Because Cleveland Tramrail rail sizes are never changed there was no problem in supplementing the old system with this new equipment.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy.

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
1155 EAST 283RD ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

ACCIDENT FREQUENCY

Can Be Controlled

By J. E. TURNER
Works Manager
General Steel Castings Corp.
Eddystone, Pa.

IN looking back over the period in which our plant broke the all-time safety record for foundries (as recorded by the National Safety Council) I sometimes wonder that we were able to turn in a safety performance of this nature. Our accomplishment was certainly not an easy one, for the very nature of our business makes it easy for workers to get hurt. Constant desire of the management, close supervision by those in authority and a co-operative spirit among the employees were important factors.

Added to this natural hazard were all of those accident-causing conditions common to the current period: Labor shortages, green labor, high labor turnover, critical equipment and material shortages, and an unrelenting demand for speed in producing castings that had to meet the highest government standard for quality. Work conditions of this nature make the achievement of safety a very difficult problem—but the fact that our plant did do the job proves that it can be done when the mind is made up to it.

We started making steel at Eddystone about 14 years ago with some 600 employees. The plant was designed to produce steel castings such as railroad locomotive and car beds, frames, trucks and wheels, as well as heavy machine frames, cylinders, ship's anchors and similar castings.

The foundry building is composed of east and west molding bays and a core-making bay through the center, connected by a long cross bay to a machine shop. These buildings house some 30 traveling cranes ranging in capacity from 25 to 75 tons. Steel is produced in three 60-ton, open hearth, oil-fired furnaces, and 60-ton ladles are used to carry molten metal to molds for castings weighing from 10 to 60 tons. These castings are heat-treated after chipping, grinding and core cleaning, and about 30 per cent of them are machined in the machine shop. We also operate a large pattern shop.

Adopt Adequate Control

There were quite a number of serious operating problems in the first few years of the plant's existence as employees had to be trained in the many hazardous operations involved in the production of the extra-heavy steel castings. Our accident experience, therefore, suffered in the early years before adequate controls were adopted. The management, realizing that accidents seriously affected operating costs and manpower, set the wheels in motion to develop an accident control program.

With the aid of engineers from the American Mutual Liability Insurance Co. a safety organization was installed that effectively and gradually reduced the high accident losses. During the last 10 years this program developed a below-average experience in relation to that for the entire steel foundry industry. This improved record was not obtained by any special or costly system of accident control, but by a full understanding on the part of top and operating management that there was a job to be done which could only be accomplished by the use of every facility of the company and by the co-operation of the president down to the common laborer. Much credit must be given to labor for its highly co-operative attitude in making our plant a safe plant in which to work.

The results of greater plant safety were measurable. Along with the reduction in accidents there was a significant increase in finished steel castings tonnage; present operations employing over 2000 workmen

(*Continued on page* 228)

From the *American Mutual Magazine*.

MADE OF ASBESTOS
Core Makers can carry TWICE as many
● Transite Core Plates are exceptionally light in weight—about ¼ as much as many metal plates of same size. They have these additional advantages:
Strong and durable—Made from a composition of asbestos and cement, two of nature's most enduring materials.
Less breakage—Fracture-resisting, shock-absorbing asbestos-cement fibers minimize cracking and breakage.
Easily cleaned—Core wash, sand, etc., do not stick as readily to Transite. Ovens automatically clean underside by burning off core washes.
Economical—Long life, low initial maintenance costs result in big savings.
Low warpage—Minimum warpage assures greater accuracy for fine tolerances.
Corrosion resistant—Surface stays smooth after long service.
Perforated plates—also available, to eliminate green cores, cut baking time.
For complete information, write to Johns-Manville, 22 E. 40th St., New York 16, N. Y.
JM
Johns-Manville
TRANSITE CORE PLATES

for fuel-fired furnaces...for Fast Delivery

ORDER A McKee Eclipse CENTRIFUGAL BLOWER!

Now you can get immediate delivery from stock on most sizes of McKee Centrifugal Air Blowers. No longer do you need to wait for *quality-built* air blowers! Heavy, durable construction throughout assures long life and negligible vibration.

Use a *centrifugal* type air blower for minimum upkeep and operating costs . . . No wearing parts except motor bearings . . . And the electric current consumption is proportional to actual air usage.

For air requirements from 2 ozs. to 2 lbs., *where steady air pressure is required at all times regardless of consumption,* call or write McKee-Eclipse . . . you'll get fast action. Representatives in all principal cities.

McKee Eclipse

ECLIPSE FUEL ENGINEERING COMPANY

If it's for Gas—buy Eclipse

Gas Combustion Equipment, Industrial Gas Furnaces, Steam Boilers and Dowtherm Generators, Centrifugal Blowers and Heat Treating Containers.

725 So. Main St.
Rockford, Ill.

(*Continued from page 226*)

are producing monthly up to 5000 tons of rough and finished steel castings.

The control of accidents at our plant, of course, starts with top management which gave the green light to the foundry works manager and his staff for necessary expenditures and which is personally co-operating in the program. Our safety engineer and our personnel director collaborate in the investigation of accidents, conduct safety meetings, safety inspections, safety education and distribution of literature. Some 50 employees, representing the three shifts of all departments, attend monthly safety meetings where unsafe acts and unsafe conditions are reviewed—accidents and causes are discussed and remedies established. Minutes of these meetings are distributed among all foremen of the plant to keep them fully advised of the activities. The foremen also assist in the appointment of representatives to the safey committee and periodically attend the committee meetings.

Through the use of safety pictures and lectures, our insurance company engineer carries on a co-ordinated program of safety education for our foremen and safety committee groups. This has been very effective in developing and maintaining interest in accident prevention.

Recently the Eddystone plant foremen organized a Foremen's Club, which, in connection with production and safety, meets monthly and devotes part or all of each session to some safety subject. The foremen are considered the safety directors of their particular departments and all safety problems, employee discipline in connection with safety, accidents, etc., are brought to their attention and they work together in the development of a solution.

Safety inspections are made regularly by the safety engineer who also receives verbal and written recommendations at the safety meeting or during his plant tours. He keeps accurate records of all accidents from first-aid to lost-time injuries. These are investigated jointly with department foremen and safety committeemen through the use of foremen's report of accident investigation, which forms are reviewed at all safety meetings.

Co-operating with the safety engineer s a crane, hoist and cable inspector whose entire time is devoted to the inspection of this equipment, which also includes slings, chains and cables, carrying hooks and other conveying apparatus. Accurate records of inspections are kept up-to-date and available for scrutiny.

Adopt Safety Recommendations

The maintenance department assists the safety organization by attending safety meetings and by prompt adoption of recommendations developed by committeemen or safety inspectors. When new machinery is installed, special consideration is given to the proper guarding of any exposed gears, belt drives or point of operations, and occasionally the engineering department is called in to assist in the special design of guards necessary to prevent accidents in the operation of machines. An employee of the maintenance department also makes regular tests around butane gas pipe lines with an explosimeter to find gas leaks. Butane gas is used in connection with welding, burning and in the operation of heat-treating furnaces.

Monthly records of department accidents, safety bulletins, etc., are posted on large and small bulletin boards in the yard and throughout the plant. The number of days the plant has gone without a lost-time case is also posted on the outside bulletin board and changed daily. We feel that the posting of statistics and safety literature, also the exhibiting of broken goggles and other damaged personal protective equipment have been helpful in keeping the average employee informed and interested in these safety problems. Goggles are issued at the time of employment to those who require them in their work, and they are carefully fitted by an attendant. The use of goggles is strictly enforced by all supervisors, and top management sets a good example by wearing eye protection when in departments where their use is required. Safety-toe shoes are also carried in stock, and employees are fitted. While the use of safety-toe shoes is not compulsory they are strongly recommended

(*Concluded on page 230*)

ENGINEERING SERVICE

May We Serve You In Your
Reconversion and Peace Time Problems

WE HAVE NOTHING TO SELL BUT OUR SERVICES

We serve only the foundries, both the largest and the smallest

Our Clients are Already Preparing for Post-War Conversion, Including Finances During the "Change-Over" Time.

OUR ACTIVITIES

Surveys — Reports
Appraisals — Plant Design
Cost Systems — Plant Remodeling
Wage Incentive Plans — Continuous Systems
Executive Control Methods — Semi-Continuous Systems
Production Control Systems — Present Operation Modernized
Progressive Flow For Molding, Coremaking, Cleaning Operation
Carman Cupola Control System

EDWIN S. CARMAN, Inc.
Engineers and Foundry Consultants
LEE ROAD AT MAYFIELD — CLEVELAND 18, OHIO

GENERAL CHEMICAL ALKALI FLUOBORATES

Chemicals of Progress for the LIGHT METAL INDUSTRY

Ammonium Fluoborate NH_4BF_4

Melting Point: 230° C (446° F) compound sublimes. At pouring temperatures, rapid sublimination.

Solubility in water:

Temp. °C	%NH_4BF_4 by weight
16	20.0
40	26.5
55	33.2
70	38.7
100	46.5

pH of 1% aqueous solution: 3.4 at 25° C (77° F)

Potassium Fluoborate KBF_4

Melting Point: 529.5° C (985° F) compound essentially stable. At pouring temperatures, slow decomposition.

Solubility in water:

Temp. °C	%KBF_4 by weight
25.	.55
34.7	.94
54.5	1.98
78.0	4.58
100.0	8.5

pH of saturated aqueous solution: 3.0 at 25° C (77° F)

Sodium Fluoborate $NaBF_4$

Melting Point: 384° C (723.2° F) slight decomposition. At pouring temperature, slow decomposition.

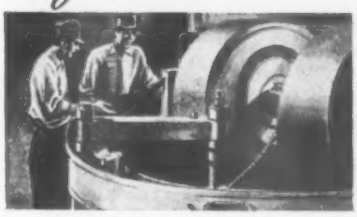
Solubility in water:

Temp. °C	% $NaBF_4$ by weight
26.5	52.1
40.0	55.3
78.0	64.4
100.0	68.6

pH of 1% aqueous solution: 3.0

FIRST IN FLUORIDES . . .

General Chemical leadership in the field of fluorides embraces a wide range of fluorine compounds. Our long experience and "know how" may prove as invaluable to you in your operations as they have to many other users of such products. For helpful technical service and full information on the Alkali Fluoborates, contact the General Chemical Sales and Technical Service Office nearest you or write General Chemical Company, Fluorine Division, 40 Rector Street, New York 6, N. Y.

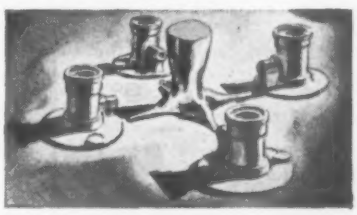


SUPERIOR INHIBITORS

Do not lose inhibiting action during baking; no excessive gassing. Give greater core strength.

SECOND BAKING UNNECESSARY

Eliminate spraying, second baking operation, and duplicate handling. Save time, labor, and step up oven output.



BETTER CASTINGS

. . . finer grain, cleaner fracture, higher tensile strength and elongation obtained.

The special properties of General Chemical Alkali Fluoborates as oxidation inhibitors—plus their high effectiveness in production of finer grain metals—make them ideally suited to the exacting fabrication requirements of the Light Metal Industry.

SUPERIOR INHIBITORS

General's Potassium and Ammonium Fluoborates, for example, have been found superior to many other inhibitors mixed in core sands. Due to their higher melting points and slower rates of decomposition, they do not lose inhibiting action during baking nor do they produce excessive gassing during pouring. In addition, they can be used with the cheaper, higher baking core oils!

With these chemicals of progress, greater core strength is obtainable too . . . spraying and second baking operations are unnecessary . . . and objectionable fumes may be reduced or eliminated.

BETTER CASTINGS

Manufacturing experience has demonstrated that when these Alkali Fluoborates are used as sand treating agents, there is often marked improvement in the physical properties of the metal . . . melting pot additions of Potassium Fluoborate produce aluminum castings in which finer grain, cleaner fracture, higher tensile strength and increased elongation are obtained.

GENERAL CHEMICAL COMPANY
40 Rector Street, New York 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore Boston • Bridgeport (Conn.) • Buffalo • Charlotte (N. C.) Chicago • Cleveland • Denver • Detroit • Houston Kansas City • Los Angeles • Minneapolis • New York Philadelphia • Pittsburgh • Providence (R. I.) • San Francisco • Seattle • St. Louis • Utica (N. Y.) Wenatchee (Wash.) • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wisconsin

In Canada: The Nichols Chemical Company, Limited Montreal • Toronto • Vancouver

(*Concluded from page 228*)

where there is danger of foot injury. Should an employee have a toe accident, their use thereafter by the injured employee is almost mandatory.

It might be added that safety has not been forced on the employees at Eddystone but has been sold to them through a system of education, and they have responded very well and fully co-operated in the elimination of unsafe acts.

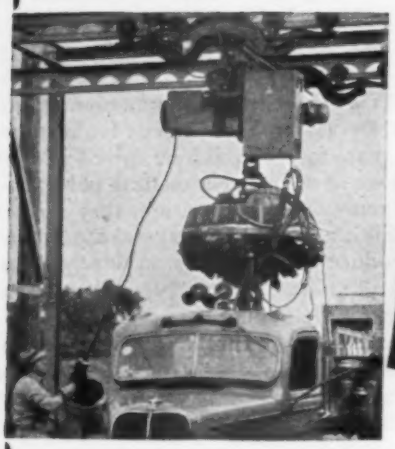
To our satisfaction we have definitely proved that accident frequency in a steel casting plant can be controlled at nominal cost and that accident prevention pays handsomely in increased production and harmony among employees. We definitely aim to keep our accident-control program functioning as a part of our production operations. One good reason for this, at the moment, is that we are keenly aware that the quantity and quality of the products made in our plants are affected by the safety of our workers.

Offers Industrial Safety Pamphlet

National Safety Council, 20 North Wacker Dr., Chicago 6, has available a 16-page pamphlet, "Industrial Safety Tomorrow," obtainable without cost, prepared for 38 co-operating national organizations, including industrial management, civic and insurance associations, labor unions and educational institutions. The pamphlet is a specific program designed to help industry meet the threat of an increased accident toll under changed conditions of the postwar period. C. R. Cox, president, National Tube Co., Pittsburgh, headed the special Committee on Postwar Industrial Safety, which prepared the publication.

A detailed list of 32 main elements of an effective industrial safety program, grouped about topics such as safety organization, inspectors, accident records, first aid and medical facilities, buildings and grounds, re-employment of service men and women, etc., is included in pamphlet.

Material Moves Fast With STEARNS Magnets



Monarch Machine Tool Co. gets fast handling of chips and shavings from briquetting machine to bins or truck with a Stearns Lifting Magnet.

Only one of many jobs efficiently and economically done by Stearns Magnet. You may have a similar problem in which we can be of definitely profitable assistance.

For moving material quickly at low cost, saving hand labor on difficult and dangerous operations, increasing storage capacities—install a dependable, sturdy Stearns Magnet.

Write for our Bulletin 35.

Stearns MAGNETIC MFG. CO.

MAGNETIC PULLEYS
SEPARATORS • CLUTCHES • BRAKES
662 So. 28th St. Milwaukee 4, Wis.

Book Review

Chemical Formulary, Vol. VII, 1945, by H. Bennett, 477 pages, published by the Chemical Publishing Co. Inc., Brooklyn, N. Y. Price $6.

This book is the seventh volume of a series containing chemical formulas for manufacturing a wide array of compounds and products for applications in many fields. Subject matter is divided into 21 chapters relating to such phases as adhesives, flavors and beverages, cosmetic and drug products, emulsions and colloids, farm and garden specialties, food products, inks and marking substances, skins, leathers and furs, lubricants and oils, materials of construction, metals and alloys, paint and other coatings, paper, photography, polishes, pyrotechnics and explosives, plastics and resins, soap and cleaners, textiles and fibers, and miscellaneous. A list of chemicals and sources of supply are included.

Issues Symposium

American Society for Testing Materials has published a 75-page pamphlet, entitled "Symposium on Analytical Colorimetry and Photometry," which contains a series of discussions by leading authorities on instrumental and chemical phases of the subject. Topics include colorimetric analysis and Beer's law, filter photometers, glass photometric filters, spectrophotometers, chemistry in colorimetry, bibliography on colorimetric methods, colorimetric methods for aluminum-base, magnesium-base, other nonferrous, and ferrous alloys. Copies of the pamphlet may be obtained for $1.

Wins "E" Renewal

Herman Pneumatic Machine Co., Pittsburgh, manufacturer of molding machines, has received a fourth renewal of its Army-Navy "E" award. The new pennant with its four stars may be retained for a year.

IN OUR EXCLUSIVE METAL-CAST PROCESS U. S. PAT. NO. 2197660 LIES THE SECRET OF BETTER FERRO SILICON

50% Fe Si

75% Fe Si

85% Fe Si

90% Fe Si

Some men are content to do as always has been done. But others set about finding the better way, using contributions of experience and scientific research to drive toward improved products. This spirit of progress led Ohio Ferro-Alloys Corporation to develop a new method of casting Ferro Silicon. Instead of pouring into sand molds, the Ohio Ferro-Alloys Corporation cast Ferro Silicon in clean metal molds.

UNIFORM PRODUCT

The old sand-cast process delivered with the Ferro Silicon an unpredictable percentage of impurities. Variations in steel are inevitable. But one variable can be eliminated by use of METAL-CAST FERRO SILICON produced only by Ohio Ferro-Alloys Corporation.

Consultation on problems of iron and steel production is a regular service of Ohio Ferro's experienced staff. End product betterment is foremost in mind. We invite inquiry.

FERRO-SILICON 50%, 75%, 85%, 90%

FERRO-CHROMIUM • FERRO-MANGANESE

BOROSIL • SIMANAL

BRIQUETS

OFA SILICON, MANGANESE, CHROME

© OFA 1935 © OFA 1941

PHILO RAINIER

Ohio Ferro-Alloys Corporation

Canton, Ohio

Chicago Detroit Pittsburgh San Francisco Tacoma

foundry DEVELOPMENTS

FOLLOWING investigation of microporosity in magnesium castings, W. A. Baker reported to the Institute of Metals (Great Britain) that evidence indicates freezing shrinkage is the primary cause of porosity, but that dissolved gas (hydrogen) will aggravate the defect. To avoid porosity due to gas, moisture or corrosion products on metal before melting must be avoided, and overheating of any parts of sand molds for example by use of multi-gates, also must be avoided. Further he recommends that to minimize the amount of porosity, the pouring method, speed and temperature should be such that steep temperature gradients are set up in the required direction during pouring. Those must be maintained during solidification by providing adequate feeders, and in that connection two points need to be stressed: The efficiency of the feeder is increased if pouring is such that the feeder cavity is preheated by the metal flowing into the mold proper, and solidification in magnesium alloys cast in green sand molds tends to be unduly fast from the mold face inward, and measures which delay solidification and so increase the time available for heat flow from the feeder will in many cases improve the soundness of the casting. That is likely to apply to castings of thin section or to castings where the distance from the feeder to the remote part is large in relation to cross-sectional thickness. Most convenient practical method of controlling overall rate of freezing appears to be careful control of pouring temperatures, intelligent use of chills, heating the mold cavity immediately before pouring, insulating feeder heads, etc. Unduly slow solidification is harmful since conduction of heat may proceed too far and smooth out the desired temperature gradient, reaction between metal and mold moisture may be promoted giving rise to gas unsoundness, and grain size may be increased and the casting consequently weakened.

• • •

HABIT and tradition are customs in business and industry which should be reviewed from time to time to determine whether they function as well as believed, or whether they can be improved. For example in one airplane plant the age-old method of making forms or containers for producing plaster patterns which vary considerably in size is to use separate wood boards which are fastened together at the corners by applying a layer of plaster, a piece of burlap and another coat of plaster over the burlap. In addition to the time required for drying the plaster considerable care had to be exercised in establishing and maintaining the proper corner contours until the plaster set. However, one of the firm's employes suggested the use of corner clamps for the purpose which eliminated use of burlap and plaster, time loss and provided sturdier construction.

• • •

CHILL effect in centrifugal casting of bronzes is a function of the thermal capacity of the metal mold, and according to one authority a mold wall thickness of approximately 2½ times the wall thickness of the casting will provide the proper chill effect without unduly shortening mold life. To get best results mold temperatures should be maintained between 350 and 400 degrees Fahr. Where rapid chilling is essential a mold wash composed of colloidal lead and graphite sprayed on is satisfactory.

(*Continued on page* 234)

"Die-Less Duplicating" Eliminates Time Loss and Die Expense!

The DI-ACRO Bender is a precision unit, designed to form and duplicate an unlimited variety of parts and pieces—eliminating, in many cases, the need for special dies. Tubing can be accurately formed with the DI-ACRO Bender to a center line radius as small as 2½ times the outside diameter of the tube without distortion. Shapes and outlines, impossible to obtain with regular production dies, are easily formed with the DI-ACRO Bender. These include round, half-round, hexagon, and square rod, tubing, angle, channel, moulding, strip, stock and bus bar.

Stops may be set and material guides mounted for production work in excess of 1000 operations per hour. The Bender is compact and portable, ideal for temporary or permanent work. There are no extra parts to purchase, as the DI-ACRO Bender has been built to cover a wide working range, with simple conversions.

Peacetime production for industry, forecasts the return of Wrigley's Spearmint Gum—that favorite "help on the job," for workers everywhere. But Wrigley's Spearmint will be back only when conditions permit its manufacture in quality and quantity to meet your needs. Until that day, we ask you to remember the famous Wrigley's Spearmint Wrapper shown at right, as your guarantee of the finest chewing gum that can be made.

You can get complete information from O'Neil-Irwin Manufacturing Co., Minneapolis 15, Minn.

Typical Shapes Formed by the DI-ACRO Bender

Remember this wrapper

Z-86

Get the FACTS *about* HEATING EQUIPMENT *that Gives More Uniform Results at Lower Cost*

GEHNRICH OVENS

Batch or Continuous
Gas • Oil • Electric
Steam

Core Baking • Mold Drying
Core Spray Drying
Wax Mold Drying
Blacking • Pasting
Baking Coatings
on Castings

•

ROCKWELL
MELTING FURNACES

Stationary or Tilting
Crucible Type
Reverberatory Type
Oil or Gas Fired

For Brass Bronze, Aluminum
Copper, Silver, Soft Metals, etc.

•

GEHNRICH OVENS
for HEAT TREATING
CASTINGS to 1250° F.

Box or Conveyor Type

Ageing • Preheating
Annealing • Normalizing
Stress Relieving

•

ROCKWELL FURNACES
for HEAT TREATING

Box • Car • Pit
Roller Hearth

Bell • Hood • Elevator
All Conveyor Types

Annealing • Normalizing
Malleablizing • Stress Relieving
Heat Treating

Write for These Helpful Bulletins

GEHNRICH OVENS • ROCKWELL FURNACES

W. S. ROCKWELL COMPANY • 210 ELIOT STREET • FAIRFIELD, CONN.

(*Continued from page* 232)

Where a slower chill rate can be tolerated, a mixture of bentonite and silica flour has worked out well.

• • •

LARGE electric utility firm on the East Coast using the sluicing or hydraulic method for ash disposal installed with other materials a few pieces of low-alloy, machinable gray iron pipe in the line a few years ago to determine relative wearing qualities. Later examination of the line indicated that the pipe showed appreciably less evidence of wear, and while sufficient data have not been obtained to determine why one type is better than another, it indicates that tough machinable gray iron has greater resistance under the operating conditions. Although no claim is made that the perfect composition has been found, actual experience with the few lengths tested led to the placement of an order for 2400 feet of the pipe for a more complete installation.

• • •

ELECTRICITY when properly used, is not a fire hazard, but as mishandling and accidents are not always avoidable, electrical apparatus should be protected by suitable fire-extinguishing equipment. For protecting small open and semi-enclosed rotating units, switches, appliances and other commonly used electrical devices, portable vaporizing-liquid or carbon dioxide fire extinguishers may be employed according to Safety Research Institute Inc., New York. At least one large or two small units, bearing approval of Underwriters' or Factory Mutual laboratories, should be placed near each piece of apparatus. More may be needed for large motors, generators and switchboards, and they should be mounted where they are readily accessible, but not on the apparatus to be protected nor where they are likely to be cut off by fire. As gases given off by burning insulation are poisonous, vaults and other enclosures should not be entered without suitable gas masks.

• • •

COST OF hot work plays an important part in the overall cost of operation in an openhearth shop according to E. N. Hower, Homestead Works, Carnegie-Illinois Steel Corp. Labor and material cost may range from 5 to 25 cents per ton of steel produced. Hot work time, depending upon the individual shop condition, will generally range from 4 to 15 minutes per heat, and represent from ½ to 2 per cent of actual operating time. Shops which are operating near the top of those ranges may have an excellent opportunity to effect worthwhile savings by careful analysis of their hot patching practices.

• • •

NEW rust preventive coating for protection of metal parts and equipment during storage, shipment, and in some cases in service recently has been developed. It is a cold dip, rapid drying coating which may be applied either by dipping or spraying as its viscosity is comparable to that of water. It conforms to Ordnance Specifications AXS-673, Rev. 1, Amend. II, and is said to be non-abrasive, non-corrosive, and easily removed with ordinary solvents. It is claimed to have a high melting point in excess of 250 degrees Fahr., and the coating remains flexible at temperatures 20 degrees below zero.

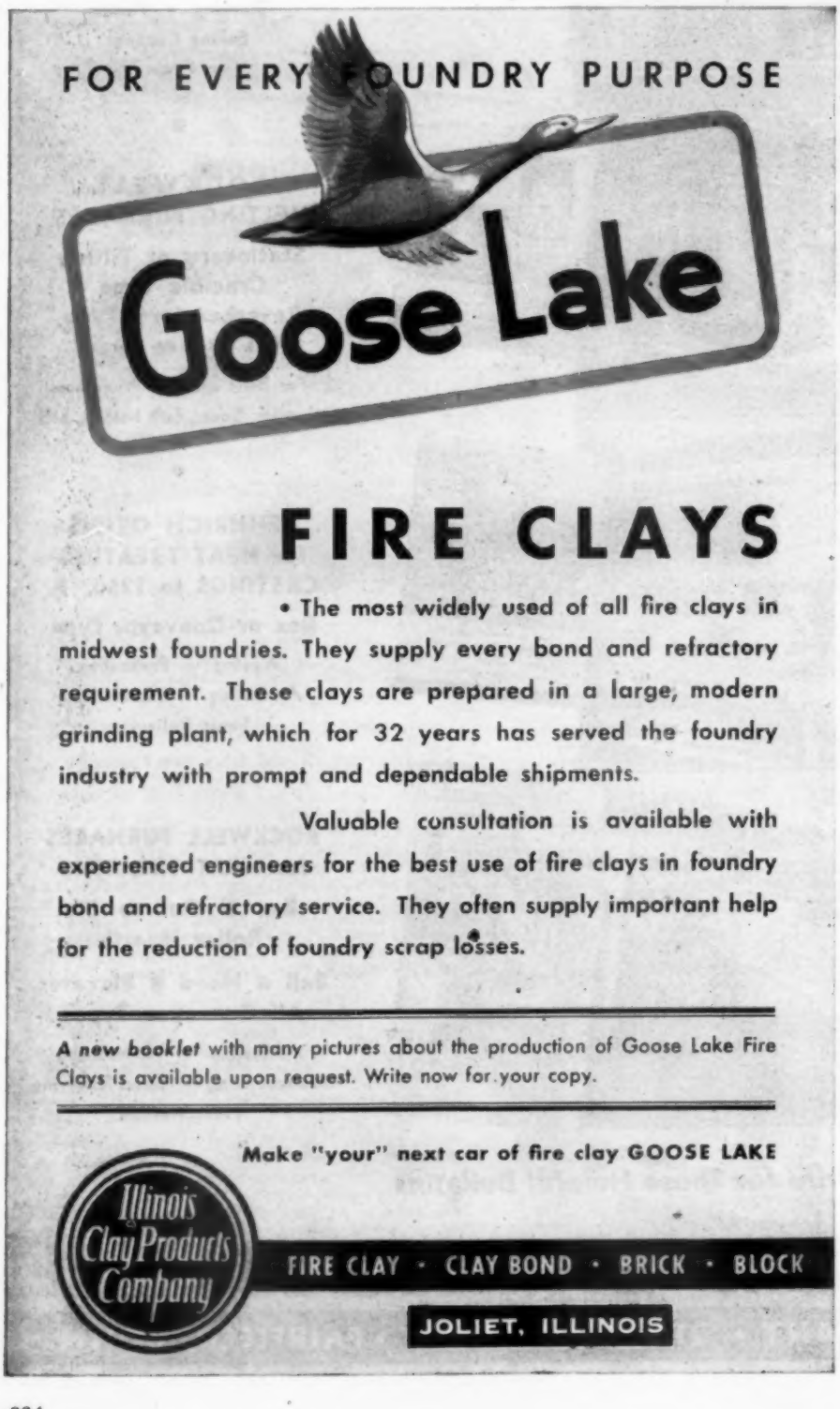
• • •

INCREASING attention being given to the production of aluminum alloy castings in permanent molds has led, according to recent reports, to an interesting set-up for the manufacture of finned cylinder heads for airplane and other applications. Difficulty in running the deep, thin fins is said to be overcome by use of a vacuum jacket which withdraws the air in the mold cavity, and through the combination of unrestricted flow and suction the molten metal runs to the tips of the fins.

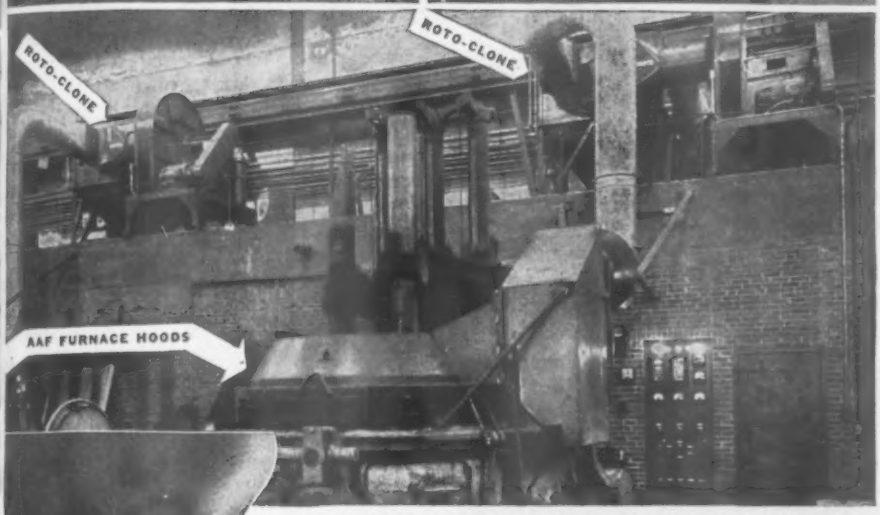
• • •

APPLICATION of the right lubricant to machines and other equipment has considerable effect on their life and operating qualities, and practice is to place skilled workers in charge of lubrication. However, that no longer will be necessary through development of

(*Concluded on page* 236)


FOR EVERY FOUNDRY PURPOSE
Goose Lake
FIRE CLAYS
• The most widely used of all fire clays in midwest foundries. They supply every bond and refractory requirement. These clays are prepared in a large, modern grinding plant, which for 32 years has served the foundry industry with prompt and dependable shipments.
Valuable consultation is available with experienced engineers for the best use of fire clays in foundry bond and refractory service. They often supply important help for the reduction of foundry scrap losses.
A new booklet with many pictures about the production of Goose Lake Fire Clays is available upon request. Write now for your copy.
Make "your" next car of fire clay GOOSE LAKE
Illinois Clay Products Company
FIRE CLAY · CLAY BOND · BRICK · BLOCK
JOLIET, ILLINOIS

DUST CONTROL FOR ELECTRIC FURNACES



The patented AAF furnace hood in combination with Type W Roto-Clone insures positive dust and smoke control with a fraction of exhaust volumes used with general ventilation. Hood design is varied to suit the type and make of electric furnace on which it is to be used—either side or top charge. Roto-Clone maintains practically constant inflow of room air to hood regardless of gas temperature to obtain positive control during the entire melting cycle. Send for complete information and Bulletin No. 278.

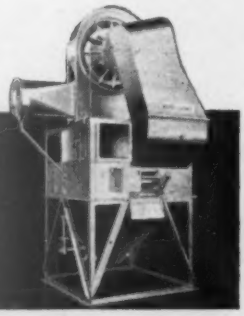
Roto-Clone's record of positive dust control at every foundry operation is the result of years of dust engineering experience. Roto-Clones are available in three Types—Type W (wet) for general foundry dust control, particularly at shakeout, sand conditioning and abrasive cleaning; Type D (dry) for grinding and snagging; Type N (Hydro-static) for the safe collection of hazardous magnesium dust. Write for bulletins.

SHAKEOUT DUST CONTROL MADE EASY

AAF-engineered side hoods exhausted by Type W Roto-Clones offer the most practical method of dust control for large shakeouts served by overhead cranes. The strong indraft from the Roto-Clone diverts the dust and fumes and prevents their dispersion to the surrounding work area. A minimum of space and piping to collect, store and precipitate the dust is required. Send for Bulletin No. 274A.

ANOTHER AAF PRODUCT

AMERICAN AIR FILTER COMPANY, INC.
INCORPORATED
266 Central Avenue Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.



ROTO-CLONE
FOR FOUNDRY DUST CONTROL

The reliable foundry pyrometer

Alnor PYRO-LANCE

The Alnor portable Pyro-Lance is a rugged, durable, portable pyrometer built with shock-resisting movement and enclosed extension thermocouple. It stands up in foundry service and gives the accurate temperature readings essential to low-cost production of sound castings. Especially suited for use on molten brass, bronze, copper, aluminum bronze, magnesium alloys, and similar metals where temperatures are not over 2300 F. Long life, enclosed thermocouple takes true readings below the surface, unaffected by dross or surface conditions.

Built in standard range, 0-2500 F. Also with bare wire thermocouple for low temperature metals in crucibles or ladles. Write for bulletins giving complete description.

ILLINOIS TESTING LABORATORIES INC.
418 NORTH LA SALLE STREET, CHICAGO 10, ILLINOIS

Foundrymen Recognize

the better job done by

SHELTON METALLIC FILLER

When casting blemishes need filling, use the cement that *sets faster and harder.* In hundreds of foundries SHELTON FILLER is used with complete satisfaction and the list is growing.

Try Shelton Filler - You Will Always Use It

WRITE FOR FREE SAMPLE

PRODUCT OF THE

AMERICAN CRUCIBLE COMPANY
... Shelton, Conn.

(*Concluded from page* 234)

a standard based on a simple system of matching colors. The standard developed by the American Standards Association at the request of the National Machine Tool Builders Association and the War Production Board divides lubricating oils into five classes and greases into three, and each has a distinctive color, parts of the machine to be oiled or greased bear the same color marking as the desired lubricant at the particular point it is to be applied. Therefore, all the oiler has to do is to match the color of the oil can or grease gun with that of the lubrication point to be sure that the right one is being used.

° ° °

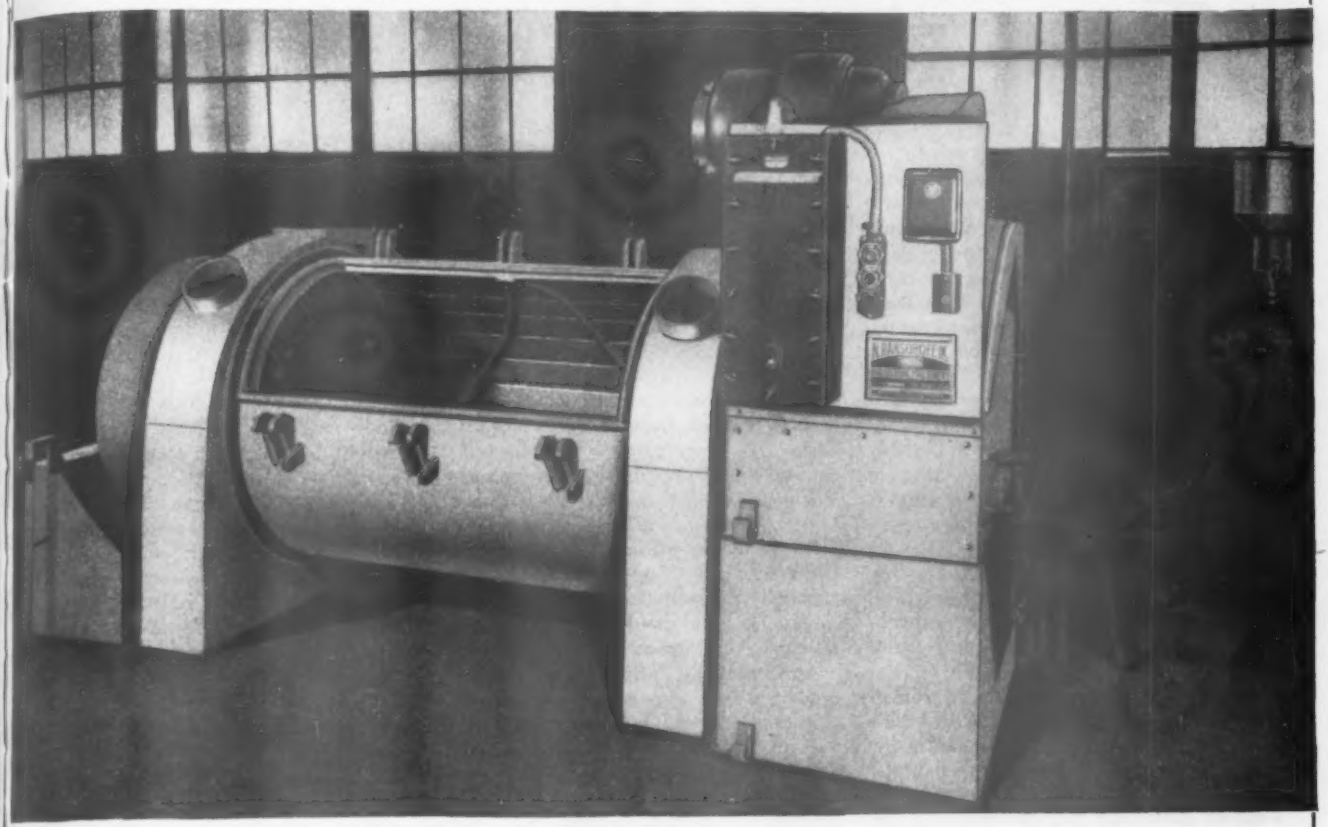
RECENTLY developed plaster composition which finds many applications is a combination of synthetic resins and other plastic materials in powder form. Resultant product after mixing with water and curing is considerably harder than the regular gypsum cements used for making patterns and for production of castings. Suggested applications include duplicate patterns, patterns for duplicator machines, forming dies for soft metal and plastics, experimental dies, checking fixtures, coreboxes, etc. where easily formed, hard, resilient and strong casts are required. Experimental application of the plaster composition to production of nonferrous castings in one foundry indicated that several gates of castings could be produced from a single mold. Much less water is employed in mixing the plaster to obtain working consistency, and maximum elevated temperature for drying or curing is 150 F. Time required in the range 125 to 150 F is from 8 to 16 hr depending on size of the cast.

° ° °

WHILE the characteristics of nozzles for bottom-pour steel ladles can vary to some extent, a satisfactory nozzle must possess at least the following characteristics according to some authorities: Low softening temperature which is essential to facilitate deformation of the seat and assure perfect nozzle closure. High density (low porosity) with high attendant mechanical strength reduces erosion. Although a dense and highly refractory nozzle tends to crack no great difficulty is encountered with dense, low refractory nozzles particularly when possessing the third essential—Appreciable permanent expansion on reheat to 2450 F found only in nozzles of low softening point, assists in sealing cracks. Other characteristics, include good workmanship, freedom from laminations and uniform burn. E. B.

The 1945 edition of the *Buyers' Guide of the Metal Industries*, obtainable without charge, has been published by the American Society for Metals, 7301 Euclid Ave., Cleveland 3. An engineering data section, covering a broad range of information required in metals specifications and use, products and manufacturers' section, are features.

RANSOHOFF AUTOMATIC STAR RETURN WET CLEANING MILLS



SAVE 30% to 70% ON YOUR CLEANING COSTS

**** easy, gentle, economical, speedy, mills are not self-destructive***

RANSOHOFF ENGINEERS have rolled up their sleeves and are back in peacetime harness. Write them to see you on cleaning problems.

SEND US A SAMPLE BATCH

we'll run a test, without obligation, and return the parts to you with our recommendations.

PUT YOUR PLANT IN LINE WITH MODERN CLEANING

Operators are sharpening pencils these days . . . it's now a "buyers' market" and costs must be watched closely.

TO ECONOMIZE . . . MODERNIZE with cleaning equipment which cuts corners in *your* favor.

The side-loading, side-unloading machine shown in large photo cleans motor end-bells and various motor castings . . . a ticklish job . . . but RANSOHOFF EQUIPMENT does it perfectly. *Cleaning time is cut 65%.* The work is rinsed before discharge to insure cleanliness and brightness. Note the Ransohoff Dispenser at extreme right holding basic solution. The small photo shows the efficient manner in which sand is discharged.

N. Ransohoff, Inc.

TOWNSHIP & BIG 4 RR · CINCINNATI 16, OHIO

The adventures of BILL

BY PAT DWYER
Drawings By RICHEY

NOW the summer is gone I think of all the months in the year I like August best. In that month summer is at the full flood, the peak of perfection. The preceding two or three months merely have served as steps leading up to the ideal and altogether too brief period when a man, if he is so inclined, can sit out on the back stoop in old pants and a sleeveless undershirt and smoke the pipe of peace. The fact that August is my natal month possibly may be a factor. If I was pinned in a corner I must admit that I have no personal knowledge of this interesting event but, as with many other more or less important events, I have accepted hearsay evidence and also calmly accepted felicitations and small tokens of esteem, and, er, all that kind of thing on a certain day.

From a horoscope practically forced upon me one night at the Sportsman's Show by a refined, but I am afraid a bit of a slippery crook, I was rather gratified to find that many famous men squalled their way into the world in the month of August. Further perusal of this interesting brochure reduced this innocent conceit to a remarkable extent. Every month in the year carried a similar list.

In that charming romance Lorna Doone, girt John Ridd states in the positive manner of a yeoman and landed proprietor, a substantial man of property, that in his experience, which he is kind enough to admit may not hold with another man, there are two things fitted beyond any others to take the hot tempers out of us. Only in one passage (you will find it on page 470 if your edition is the same as mine, a relic of my daughter's school days) do I find cause for disagreeing with friend John in his homely philosophy. In the event you cannot lay your hand on the volume I shall quote for your benefit:

"The first is to see our favorite creatures feeding, and licking up their food and happily snuffling over it, yet sparing time to be grateful and showing taste and perception. The other is to go gardening boldly in the spring of the year without any misgiving about it and hoping the utmost of everything. If there be a third anodyne, approaching these in power it is to smoke good tobacco well and watch the setting of the moon. If this should be over the sea the result is irresistible."

Unfortunately John had an advantage denied me in associating with what he is pleased to call his favorite creatures. He can have 'em. Sight and sound of a pig snuffling and grunting in a trough might soothe John's nerves, but the exhibition of a two legged pig going through a similar performance at a table always convinces me that the ancient Jewish law givers had the right idea. Elsewhere and on several occasions I have expressed an opinion on the subject of gardening. Those as wants 'em can have 'em. Count me out.

In all his expressions of opinion, John displayed sound judgment and a nice sense of values. At one time or another I have shared his views and paralleled his experiences in the places and under the circumstances he specifies. However, even to an ardent admirer the suspicion will arise that John, after the fashion of the time and place, was a little too arbitrary in limiting the time and place for smoking a pipeful of tobacco. He says that a good time and place is while watching the setting of the moon, and more particularly if the moon is setting over the sea.

A headland from which a man can look out over a placid, silver sea on a moonlight night is a good place to smoke a quiet pipe. Adequately protected and in the lea of a substantial shelter, a man can puff away contentedly while the wild sea wind, tangy with salt and laden with brine and spume and spindrift whistles overhead. He can hear the booming, battle roar of the sea rolling in tremendous volume to be smashed in clouds of foam and spray against the face of the cliff.

Unfortunately the number of headlands from which one may view the sea is limited, and they usually are situated in the most outlandish and difficult places. No roads. No conveniences. No nothing! The sea has fascinations but there are thousands of boys safely home today who saw enough of it to last a life time. If they never see the sea again it will be too soon.

This digression has taken me farther afield than I had intended. August always brings to mind a clipping taken from a local paper several years ago. The author modestly signed his or her initials to this masterpiece in prose form that flows as sweetly and smoothly as a

(*Continued on page* 240)

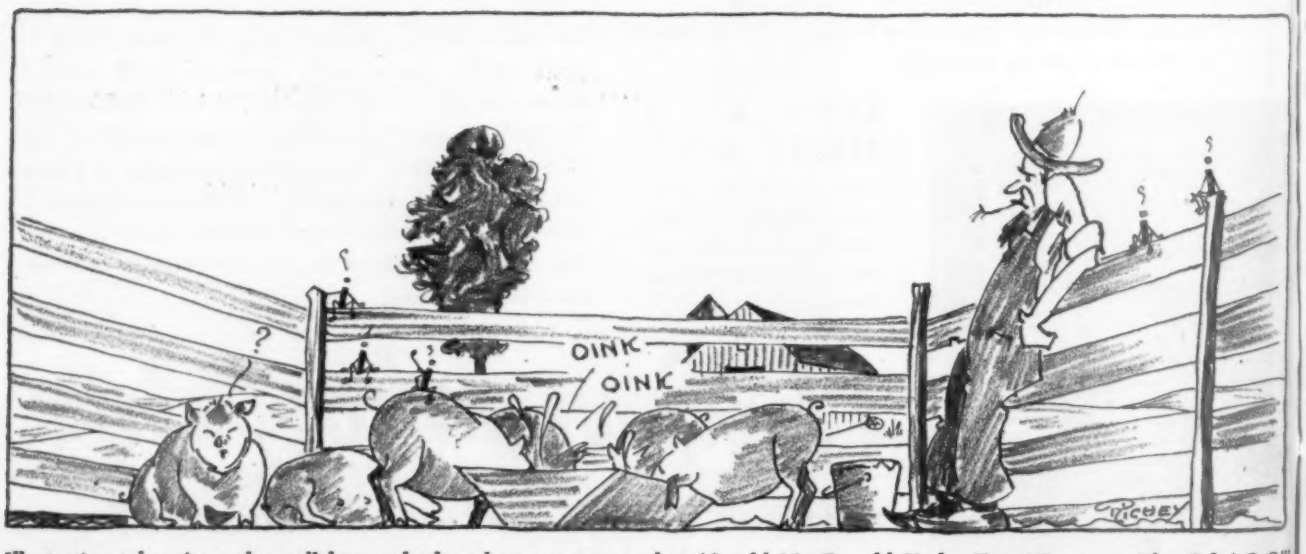
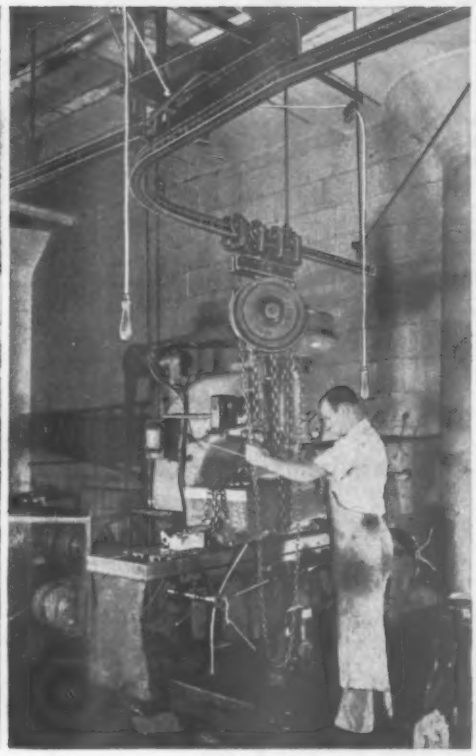
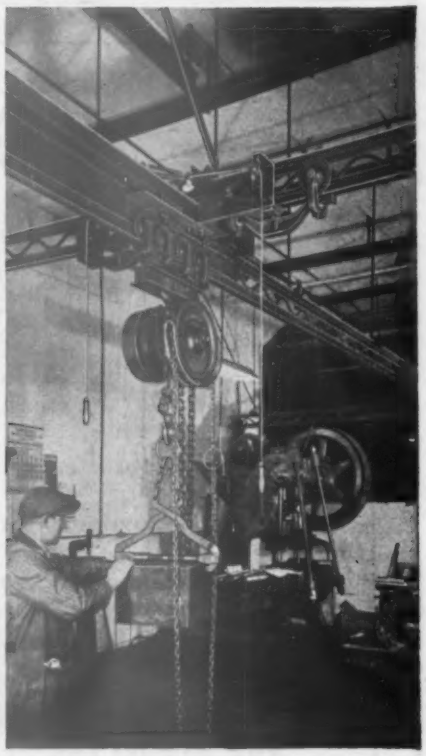
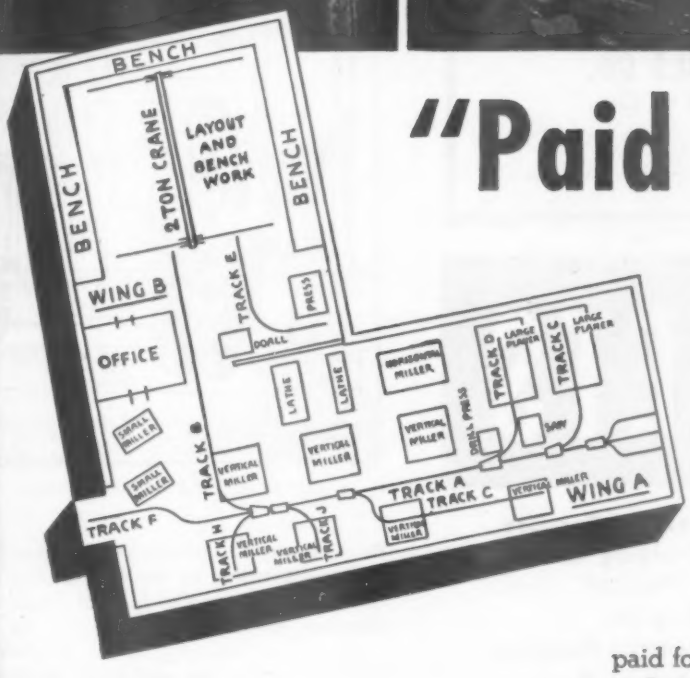


Illustration taken from the well known barber shop quartet number "O-o-ld MacDonald Had a Farm Down on The O-h-i-O-O!"

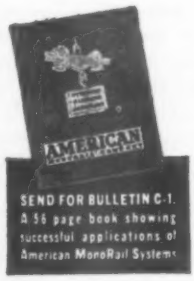






"Paid for Itself... Time and Again..."

"THIS system", says the owner, "has paid for itself time and again. Skilled die-sinkers and tool makers now work at their trade and spend little time lifting and straining to get blocks into the machines". Two ton die blocks in this small shop are handled overhead by American MonoRail. When this system was first installed it represented only a small part of the present track. Now, practically all manual handling has been entirely eliminated and every move from one machine to the other is done by American MonoRail.



An American MonoRail engineer will show you how to handle your products in less time and for less money.

THE AMERICAN MONORAIL COMPANY

13104 ATHENS AVE. CLEVELAND 7, OHIO

CEMCO
CLEVELAND ELECTRO METALS CO

★ WE ARE READY ★

For your Peace Time requirements
of Aluminum Ingots for Foundry
Die Caster or Steel Mill.
Consult us now.

Member Aluminum Research Institute

THE CLEVELAND ELECTRO METALS CO.
2391 W. 38th St. MElrose 5435 Cleveland 13, Ohio

ERIE BUCKETS

General Purpose
Dredging and Hard Digging
Dragline
Material Handlers
Hook-on Type
Ore Handling
Coal and Coke
4-Rope
Barge Type
Strayer Electric

Above types built in weights and capacities to suit your crane and job requirements.

THE COMPLETE LINE

Write for Data

ADDRESS 10510 GEIST ROAD

ERIE STEEL CONSTRUCTION CO.
ERIE, PENNSYLVANIA
Aggre Meters • Buckets • Concrete Plants • Traveling Cranes

(*Continued from page* 238)

gurgling brook in a bosky dell. To tell the honest plain and unvarnished truth, bosky is not a word I use every day, but it sounds well. In this instance it is stuck in partly for that reason and, also partly by subtle inference to mildly flatter the reader. Sure, sure he says, every one knows what bosky means. One of these here now kind of leafy places where a man can take a smoke if the mosquitos are not too thick and venomously attentive. These and other pests are not mentioned in the following:

August. Down underneath the earth the dog star sleeps when summer skies are bright with summer stars. All night long the dog star wanders in his sleep from western rim to dawn realm of the East. And then like early worker harshly stirred to toil in prisoned walls or furrowed fields, he rises with the sun and all day long ranges invisible across the skies. To Sirius we dedicate the

Ready to gab at a moment's notice

ways of summer's ardent heat and breathless hours, when, as small companion of the sun, he lopes like faithful hound at Phoebus' wheels.

These are the dog days of blazing light, days when the year begins to pause and rest, days when in every bodeful southwest breeze we seem to scent the autumn's fragrant breath, imagined ere it comes to kiss the corn and bid the apple fill each orchard hoard with ruddy richness. Now indeed the clouds in evening squadrons sail along the coast of each uncertain sunset and the dawn may bring the autumn's presence. And the year is all a tip-toe for the frosts and ripen of lazy autumn hours.

These are the dog days when the July flames to the bright gold of August noons; and autumn, robed in fern seed gown of haze, lingers and watches, waiting the command of nature's wisdom to proclaim that all the days of summer are the days that were, and rich ripe days of autumn are at hand.

Never yet did August come without

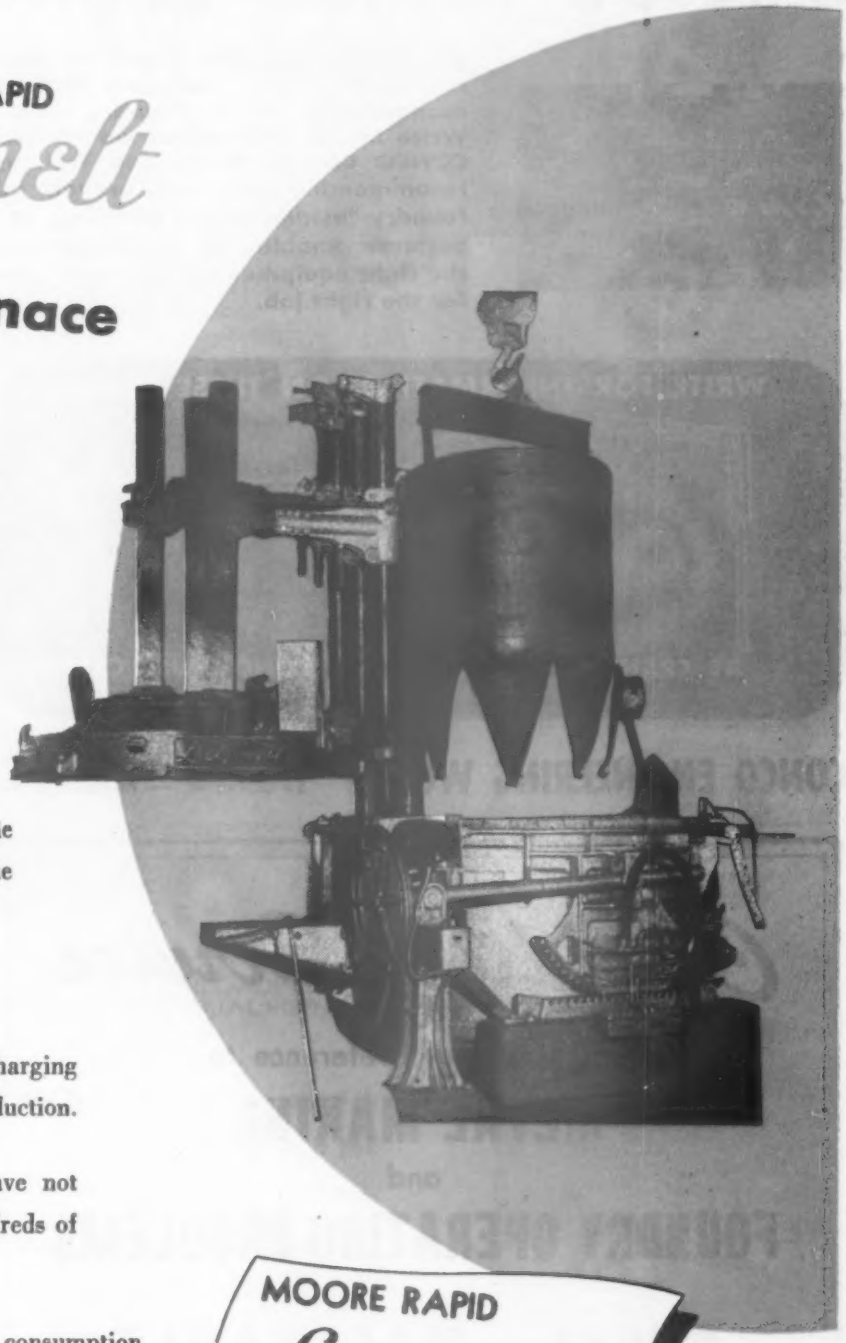
(*Continued on page* 242)

Here's how *Easy*, how *Quick* it is to Charge a

MOORE RAPID

Lectromelt

top charge furnace



- One movement of a hydraulic power control lever has lifted the furnace roof and rotated it aside. A crane has brought the drop-bottom bucket into charging position. Illustration shows the furnace immediately after the bucket has discharged its four-ton load on the furnace hearth.

- The crane moves again, rolling the bucket away; hydraulic power returns the furnace roof to operating position.

- A matter of minutes, a *few* minutes.

- The time you save, as against other charging methods, can be used in profit-making production.

- Lectromelt Top Charge Furnaces save not only time, but, as the experience of hundreds of users reveal—

- They save in power and in electrode consumption and in refractory costs.

- The quality of Lectromelt steels and irons is unsurpassed. Control of the heat is absolute. Production, or duplication, of any desired formula is definite.

- Will you need the increased production of Lectromelt Top Charge Furnaces to meet the economical demands of civilian goods production? Lectromelt literature is available. Write for it.

MOORE RAPID *Lectromelt* FURNACES

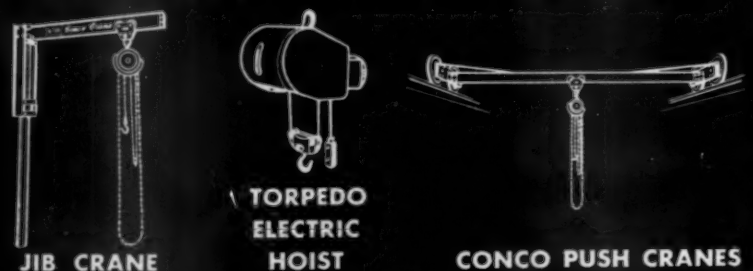
PITTSBURGH LECTROMELT FURNACE CORPORATION

PITTSBURGH . . . PENNA.

Conco FOUNDRY CRANES

● CONCO type DM Overhead Electric Crane moves materials swiftly, economically on a foundry floor. Write us for information on various CONCO Cranes, Hoists and Trolleys recommended for, and proved in, *foundry installations*. Our long experience enables us to recommend the right equipment, in the right size, for the right job.

WRITE FOR INFORMATION ON THESE UNITS



CONCO ENGINEERING WORKS Division of H. D. Conkey & Co. 53 Grove St. — MENDOTA, ILL.

Consulting Service

with particular reference to

METAL MAKING

and

FOUNDRY OPERATING PROBLEMS

STEEL • MALLEABLE
GRAY IRON
NON-FERROUS

W. HARVEY PAYNE & CO.

PRACTICAL FOUNDRY ENGINEERS

4840 BOARD OF TRADE BLDG. — PHONE WABASH 3550
141 WEST JACKSON BLVD. • CHICAGO (4), ILL.

(*Continued from page* 240)

the promise of the fall and of the cold white days beyond, the cold and dead white days beyond.

"Well, I'll tell you," Bill said one night recently after I had read for his benefit this elegant example of what a master hand can do with the English language, "August has its good points and may be enjoyed thoroughly by people who have nothing to do but sit on the back stoop sucking smoke through the stem of an old corncob pipe, soaking their old yellow feet in purling brooks or lying in a hammock writing poetry. You would hear a different story if you interviewed a foundryman during that month.

"Many years ago when I was free to flit blithely from place to place, I lingered for several months in a locomotive shop. Recognizing in me the sterling virtues of honesty, integrity and frugality, the foreman promoted me after a while to membership in the cylinder closing gang. Through a bonus arrangement the pay was good, but you know the old saying, what does it profit a man and so forth. During the month of August I was practically dehydrated. Every morning the molds made on the preceding day were hauled out of the ovens, and while they were not red hot, they were still hot enough to dry a stray lick of blacking or paste, or the mud that old Joe Smith packed in the joints. In that town the temperature starts to go up in May. By the time August arrived I could not raise enough moisture to lick a postage stamp. I had another somewhat similar job in a steel shop in Detroit in the days before they learned to make steel castings in green sand molds —"

"All ancient history," I said. "How would you like to lend a hand in writing a letter to a foreign correspondent. He says he is going to build three cupolas, 18, 26 and 32 in. diameter inside the lining. He will apppreciate our opinion on the proper height of the charging door; number, shape and size of tuyeres; height of tuyeres above the sand bottom and total height of stack."

"Quite a job," Bill pointed out, "trying to condense all the dope into an ordinary letter. The cupola is such an adaptable type of melting furnace that the various items of design and construction may vary widely without adversely affecting the operation. The height of the charging door may vary from 4 to 20 ft. Number of tuyeres on a small cupola may vary from two small openings on opposite sides to a continuous opening. Shape and size of the tuyeres is not a vitally important factor, so long as they are large enough to admit the desired volume of air. Height of tuyeres above the sand bed depends on the amount of metal to be collected in the well at each tap. Where the iron runs continuously, the tuyeres may be placed 4 to 6 in. above the sand bottom. High tuyeres require a correspondingly high coke bed and thus add to the cost of operation.

(*Concluded on page* 244)

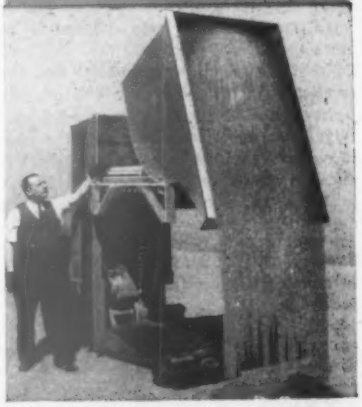
SEE — WHAT ONE MAN CAN DO with a ROURA Self-Dumping Hopper

Handles Bulk Material Quickly and Easily — Wet or Dry, Hot or Cold. Ideal for All-around Use in the Foundry.

OPERATION SO SIMPLE THAT ONE MAN MANAGES THE COMPLETE DISTRIBUTION AND UNLOADING JOB IN LESS TIME THAN SEVERAL MEN BY MANUAL METHODS

FITS ANY STANDARD-TYPE LIFT TRUCK. Ruggedly-Built

RAISE AND DUMP AT ANY LEVEL. HOPPER RETURNS AUTOMATICALLY AND LOCKS



The Roura Hopper fits any standard-type lift truck—just pick 'em up, run 'em to dumping location, pull the trip lever and the unloading job is finished and the empty hopper returns to loading position, locked and ready for the next load. They're safe and easy to handle and exceptionally well-built. *We invite you to try one on a 30-day trial basis.*

Write for NEW descriptive BULLETIN—"F"

ROURA IRON WORKS

1405 WOODLAND AVE., DETROIT, MICH.

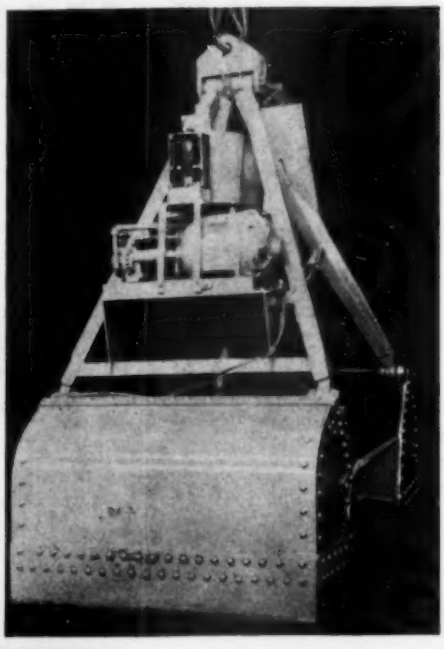
Immediate Delivery--Price $100-- 1 CU. YD. CAPACITY UNIT F.O.B. DETROIT, MICH.

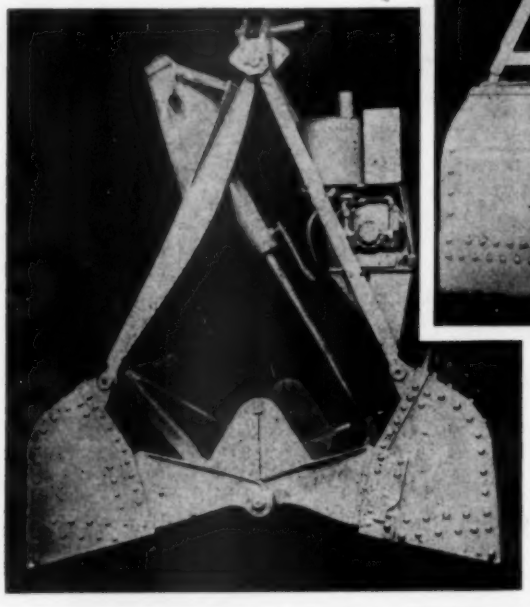
NEW HYDRO-ELECTRIC BUCKET

BY

BROWNING

This is a new hook-on fast operating electric bucket. Can be made to operate on either A.C. or D.C. The bucket operates on a new patented principle.





VICTOR R. BROWNING COMPANY, INC.

WILLOUGHBY, O.

★

TAMASTONE

A Short Cut to Speedy Production

HUNTER FOUNDRY CO., CHICAGO REPORTS

500% INCREASE

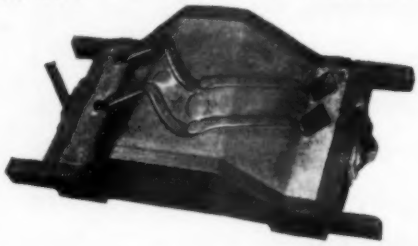
With original equipment, gated pattern and hard match only 10 to 12 molds per day were possible. Through the use of TAMASTONE Pattern Compound (100 lbs.) the job is converted to separate cope (A) and drag (B) patterns and production is now 60 molds per day. This new method enables the foundry to draw pattern from the sand as offset parting, eliminating the amount of sand to be lifted in the cope. Equipment is gated for pouring manganese.

Savings from 300 to 500% are also possible in match plate production! Write for literature today!

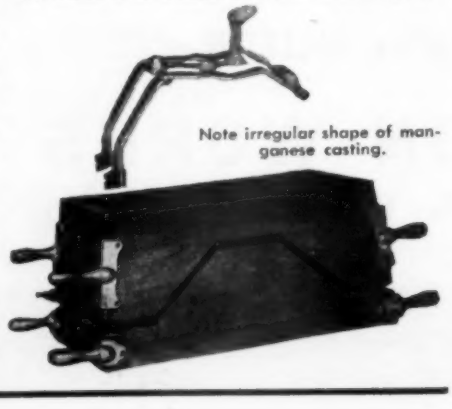
TAMMS SILICA CO.

221 N. La Salle St. • Chicago 1, Illinois

(A)—COPE is entirely made of TAMASTONE.



(B)—DRAG is of TAMASTONE with a metal gate.



Note irregular shape of manganese casting.

14" x 24" SLIP FLASK is designed to conform with extremely irregular parting line and manganese casting. Cope 11" high with 6" offset and 4" drag.

(*Concluded from page 242*)

"Total height of the stack is another variable. If the cupola is erected inside a building, it is essential that the stack extends beyond the roof. The exact distance depends on what may be considered a reasonable precaution to prevent a fire hazard on roofs in the vicinity. Where the cupola is erected outside the building and in a favored land where the climate never is severe, no stack is necessary. Under the same conditions, no charging door is required. The pig iron, scrap, coke and limestone are dumped into the open top. This type of cupola might be set up inside a building, provided a circular hood was suspended over the top to catch the smoke, flame and cinders and conduct them to the open air through a convenient opening in the wall or roof.

"Small cupolas, as for example your proposed 18-in. diameter unit, would fall into this category. It is too small for a man to work on the inside. Therefore the unit either is mounted on wheels so that it may be drawn from under the hood for repair, or the body is supported on trunnions so that it may be swung to a horizontal position for repair after each heat. In the first instance the tuyeres are arranged in the usual manner. In the second instance the blast enters through the hollow trunnions.

"For a 27-in. diameter cupola a fair average height for the charging door is 10 ft. above the sand bottom. Six tuyeres 5 in. diameter, or 4 x 4 in., 12 in. above the bottom will deliver air in ample volume at a pressure of 8 oz. Height of stack 10 ft. above the roof. With a blower capable of delivering 1200 cfm, the melting speed of the cupola is approximately 5000 lb per hr.

"The charging door for a 32-in. cupola may be 10 or 12 ft above the bottom. Eight tuyeres 4 x 4 in., or preferably one continuous tuyere 4 in. high, will deliver air in volume of 1800 cu ft per minute and at a pressure of 10 oz to melt approximately 8000 lb per hour. A great deal of useless lifting may be eliminated by placing the sill of the charging door flush with the charging floor."

Publishes Standard On Grain Sizes

Printed copies of Simplified Practice Recommendation R118-45, Abrasive Grain Sizes, are now available, according to an announcement of the Division of Simplified Practice, National Bureau of Standards, Washington.

The recommendation, effective from April 1, 1945, covers a simplified schedule of grain sizes for aluminum oxide and silicon carbide abrasives for grinding and polishing uses and for grinding wheel manufacture. It differs from the preceding issue which it supersedes by increasing the allowable oversize in No. 46 grit from 20 to 30 per cent and by the inclusion of No. 240 grit.

The Super-Cyclone's HEATING PRINCIPLE CUTS DISTORTION TROUBLES

The Lindberg Super-Cyclone is designed for the fast, economical mass heat treatment of forgings and castings with a minimum of distortion. The heaviest loads, even the 2430 pounds of gear blanks shown above, are easily handled with an economy of man hours and space that is too important to ignore.

By continuous, high-velocity recirculation of a large volume of accurately heated air, temperature is built up uniformly throughout the load in the Super-Cyclone. Because the heat source is isolated, this heating principle delivers the same amount of heat to all parts of the load regardless of its density or location in the chamber. Overheating caused by radiant heat, the principle source of distortion, is completely eliminated. Because work stays straighter, costly straightening processes are eliminated or drastically curtailed.

Uniform cooling in the Super-Cyclone is accomplished by simply cutting off the heat supply without interrupting the fan-forced recirculation of air through the charge. Furnace controls can be regulated to provide any desired program of heating and cooling cycles.

Super-Cyclone Furnaces are being used today by many of the nation's largest and most efficient foundries. They have been found to be especially adaptable for size stabilization and machineability of gray iron castings, and normalizing, hardening and other heat treating operations within the 300° to 1700° F. temperature range.

Get the facts and you'll step up your profits by drastically reducing your heat treating costs—write today for details about the Super-Cyclone and other Lindberg furnaces.

LINDBERG ENGINEERING COMPANY
2453 WEST HUBBARD STREET, CHICAGO 12, ILLINOIS

ARMY E NAVY

Lindberg FURNACES

SUPER-CYCLONE for hardening, normalizing, annealing, tempering
CYCLONE for accurate, low-cost tempering and nitriding
HYDRYZING for scale-free and decarb-free hardening

A MAJOR IMPROVEMENT IN FIRE BRICKS!

Machine Made By An Exclusive Patented Process

CROSS GRAINED REFRACTORIES

Have Longer Life and Reduce Maintenance Cost

Just as the flow lines in steel determine the life of parts made from it, so does "cross-graining" add up to 50% to the life of *Chicago Retort Fire Bricks.* Perfected by our ceramic engineers in 1940, this feature consists of a grain structure arranged at right angles to the operating surface, which reduces spalling and reinforces the lining against erosion. This and numerous other advantages you will find in the refractories of *Chicago Retort*—a pioneer, for 66 years, in fire clay products.

Save Time & Labor!
Use
Chicago Retort's FITTED LADLE LININGS
For Crane and Cylindrical Ladles.
Shapes Designed To Fit All Standard Sizes

ANTI FLUX

CHICAGO RETORT & FIRE BRICK COMPANY
Manufacturers Since 1879
208 SOUTH LA SALLE STREET • CHICAGO 4, ILLINOIS

For Efficient Post War Production Investigate LANLY

OVENS for INDUSTRY

Write for this Lanly catalog illustrating an extensive and varied line of general industrial equipment for heat-treating, drying, baking and processing.

In wide scope and high efficiency this equipment emphasizes the ability of the Lanly organization to meet your needs for standard and special equipment to meet the special needs of post war manufacturing.

We also do
Oven Remodeling and Rebuilding.

THE LANLY COMPANY
750 Prospect Ave. CLEVELAND, OHIO

OBITUARY

HENRY M. LANE, 77, prominently identified with the foundry industry for over 50 years, died Aug. 8 in Grace Hospital, Detroit, after a brief illness. Range of his activities was wide and varied—author, editor, and pioneer investigator of foundry problems. His work

HENRY M. LANE

on sand and on the construction and operation of core ovens opened up new fields. About the turn of the century he served as editor of THE FOUNDRY, and later prepared the shop instruction courses for the International Correspondence Schools. As a consultant with a large office force he designed many prominent foundries. He spent a year in France introducing American foundry methods in the Citroen plant. In recognition of long continued service and early pioneering work in the technical development of the industry, he was elected an honorary life member of the American Foundrymen's Association at the New York convention, May 14, 1941.

° ° °

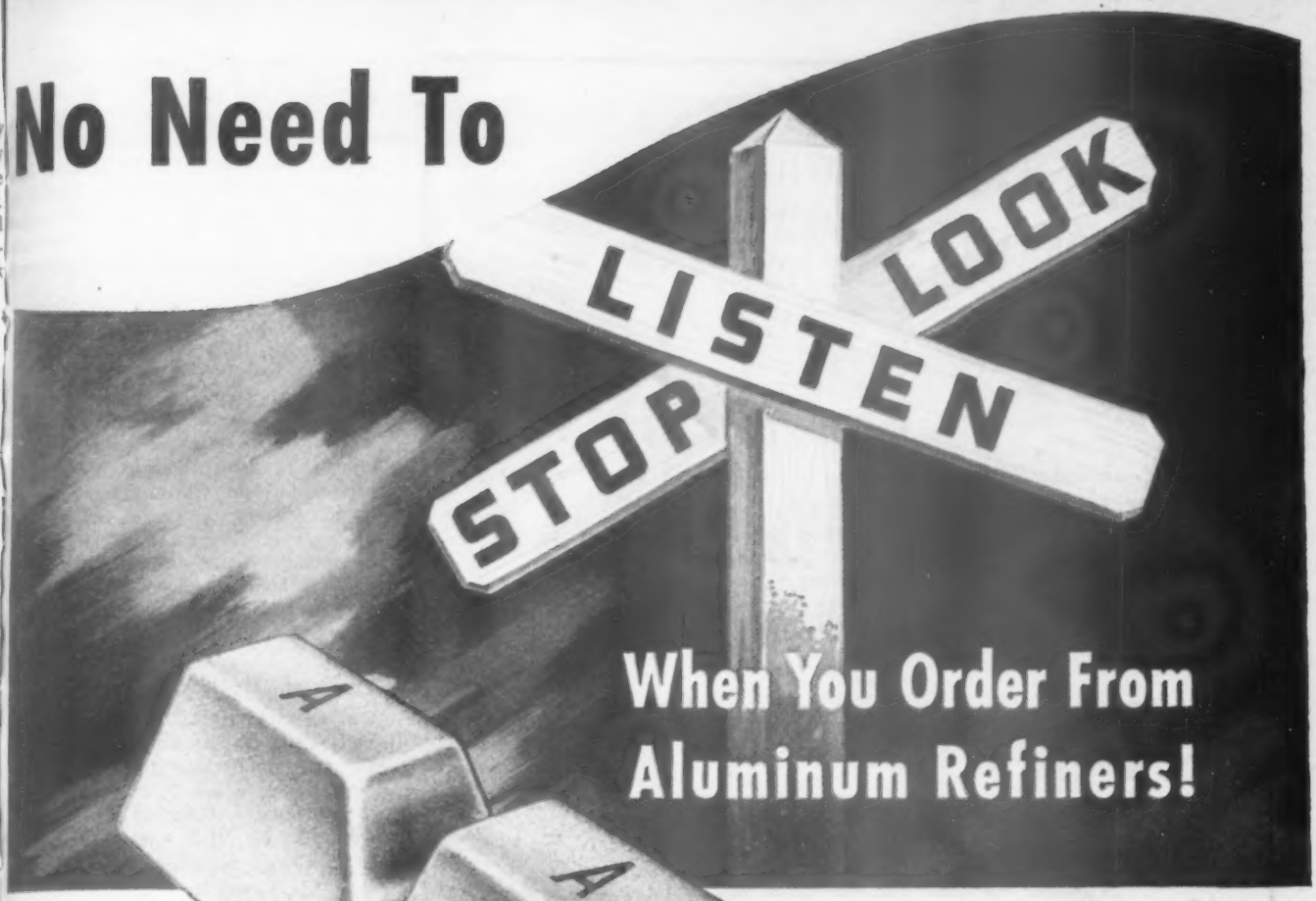
Charles E. Brinker, 60, foundry engineer for Whitehead Metal Products Co., Inc., New York, for the last 18 years, died June 30 in Nashua, N. H. Mr. Brinker was widely known in foundry circles throughout the northeastern part of the country, and during his association with Whitehead Metal Products specialized in the development of the use of nickel in cast iron. Prior to his affiliation with that company he was engaged in the foundry industry around Detroit.

° ° °

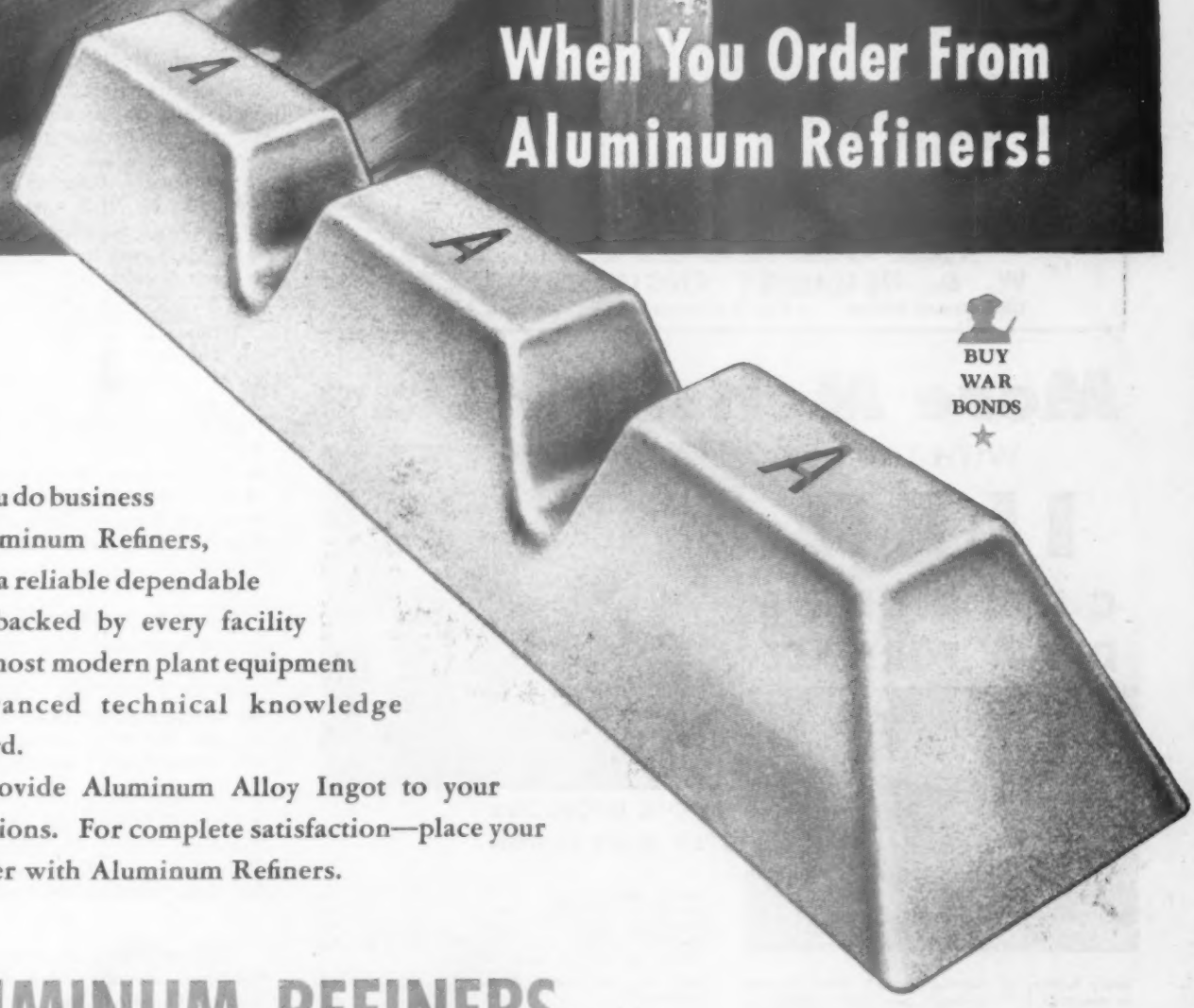
Norbert T. Jacobs, 53, manager of sales, the Wood Shovel & Tool Co., Piqua, O., died Aug. 20, in that city. Mr. Jacobs joined Wood Shovel & Tool Co. in 1933 as assistant manager of sales, and later was put in charge of the Chicago office, where he remained until 1941 when he became manager of sales with headquarters in Piqua. In 1922 he was associated with Detroit Steel Products Co., Detroit, as manager of distributor sales, leaving this company to join the O. Ames Shovel & Tool Co., Boston, of which he was vice

(*Concluded on page* 248)

No Need To



When You Order From Aluminum Refiners!



BUY WAR BONDS ★

When you do business with Aluminum Refiners, you have a reliable dependable source—backed by every facility that the most modern plant equipment and advanced technical knowledge can afford.

We provide Aluminum Alloy Ingot to your specifications. For complete satisfaction—place your next order with Aluminum Refiners.

ALUMINUM REFINERS

Division of

BOHN ALUMINUM & BRASS CORPORATION • Detroit 26, Michigan

General Offices, Lafayette Building

MANUFACTURERS OF ALL TYPES AND SHAPES OF CASTING AND DEOXIDIZING ALLOYS

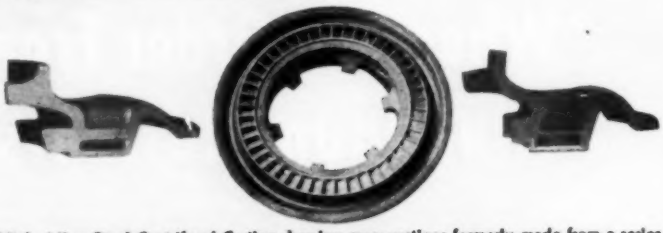
QUALITY • DEPENDABILITY
UNIFORMITY • PRODUCTION
...Vital in the Casting of Metals

FOUNDRY SPECIALISTS

A highly skilled staff of Foundrymen . . Engineers . . Metallurgists

SPECIALISTS IN:

- Methods for Improving Production and Decreasing Costs
- Metallurgical Control and Standardization
- Mechanization and Modernization
- Scientific Foundry Management
- Manufacture of Centrifugal Castings



High Alloy Steel Centrifugal Casting showing cross sections formerly made from a series of forgings. Thin section 1/16-inch—100 per cent X-Ray Inspection.

W. G. REICHERT ENGINEERING CO.
1060 Broad Street —*Foundry Specialists*— Newark 2, N. J.

More Melts Per Day

WITH THE

ILER

CRUCIBLE DRAW FURNACE

NOTE EXCLUSIVE SPLIT BODY DESIGN

Sturdy and compact in construction, the Iler Furnace is extremely low in first cost and in operating costs. Available immediately for standard crucible sizes 50 - 70 - 90 - 125 for either gas or oil operation.

Send for illustrated folder and complete information

Every feature of the Iler Crucible Draw Furnace is designed with a single aim—faster production in all non-ferrous operations. The exclusive Split-Body design provides quicker removal and replacement of crucibles, saving time on every melt. Crucible changes are made without removing cover, hence heat is trapped and retained in the upper section, saving fuel and allowing quicker reheats. An automatic air lift opens and closes the furnace at the touch of a valve, eliminating slow, heavy handwork and speeding up crucible changes. Pouring is direct, no overheating nor transfer of metals is necessary.

No tongs nor overhead handling equipment is necessary, a special open-side shank provides quick, easy handling of crucibles. The furnace rests on the floor, no pit is required.

FEN MACHINE CO.
1350 Babbit Road Cleveland, O.

ILER CRUCIBLE DRAW FURNACES

(*Concluded from page 246*)

president and general sales manager. This company and eight other shovel manufacturers consolidated to form the Ames, Baldwin, Wyoming Co., Parkersburg, W. Va., and Mr. Jacobs became sales manager of the new organization in 1930, remaining there until 1933 when he joined Wood Shovel & Tool Co.

* * *

Leon B. Brewster Sr., veteran sales engineer for the W. W. Sly Mfg. Co., Cleveland, died unexpectedly Aug. 20 in Pittsburgh, while on a business trip. Mr. Brewster, a longtime Brecksville, O., resident, had spent most of his life in Greater Cleveland area after a boyhood spent in Casanova, N. Y. A graduate of Chagrin Falls High School, he was graduated from Case School of Applied Science, Cleveland in 1908. He had been associated with the Sly Company for about 20 years.

* * *

Malcolm Fleming, 60, vice president and director, Hickman, Williams & Co., Chicago, and district manager of its Cincinnati branch office for 20 years, until his resignation July 1, 1945, died Sept. 5 in Cincinnati. A native of Garden City, Long Island, N. Y., Mr. Fleming lived in Cincinnati for 20 years, and in Glendale, O., where he made his home, for the last 5 years.

* * *

William B. du Pont, 31, manager of the Industrial Division, National Radiator Co., Johnstown, Pa., died Aug. 9 in that city. Mr. du Pont was associated with E. I. du Pont de Nemours & Co., Richmond, Va., for 3 years, following his graduation from Massachusetts Institute of Technology in 1936, and joined National Radiator in 1940 after obtaining his master's degree in chemical engineering.

* * *

Robert B. Harper, 63, vice president in charge of research and testing, Peoples Gas Light & Coke Co., Chicago, died Aug. 29 in that city. Associated with the company since 1905, he was a recognized authority among the country's gas chemists and engineers.

* * *

Percy R. Mooren, 65, owner of Meech Avenue Foundry, Cleveland, died Aug. 23 in that city. Mr. Mooren was a member of the Northeastern Chapter, AFA.

* * *

William White, secretary and general manager, Euclid Crane & Hoist Co., Euclid, O., died Aug. 14 in Cleveland.

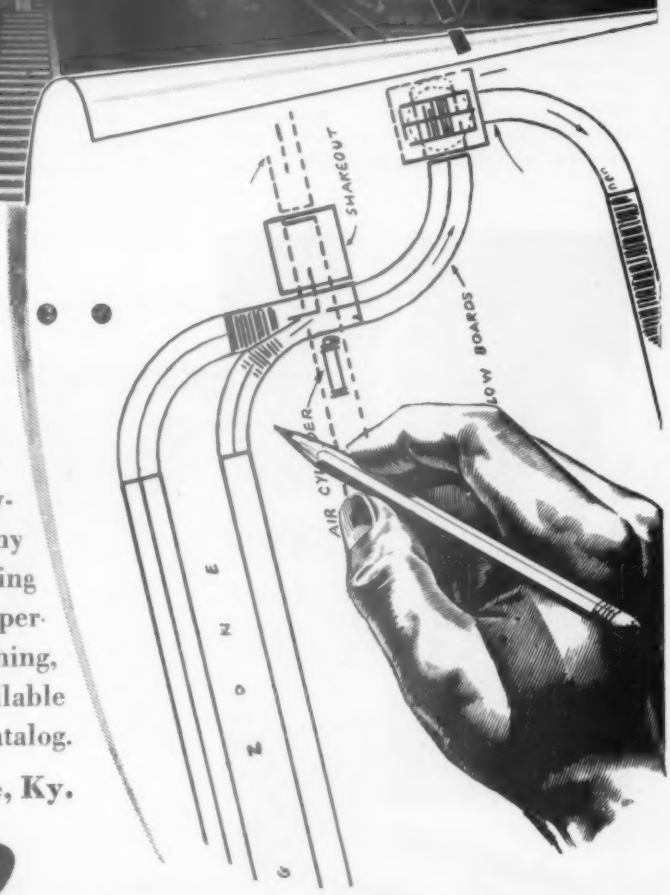
* * *

Orian V. Williams, 47, foreman for the M. Hertenstein & Co., Columbus, O., for 26 years, died Aug. 19 in Cleveland.

* * *

Arthur M. Brewster, 65, New England field engineer for Advance Pressure Castings Inc., Brooklyn, N. Y., died Aug. 30.

THE *Efficiency* PICTURED BELOW . . .



began here . . .

THESE pouring lines of Logan Heavy Duty Roller Conveyor are part of a comprehensive handling system that had its beginning with a Logan engineer. Logan Conveyors are an important production tool in many of the country's leading foundries — cutting waste motion, delays, and coordinating every operation from molding, thru shakeout and finishing, to shipping. Logan engineering help is available without obligation — write today for free catalog.

Logan Co., Inc., 580 Cabel St., Louisville, Ky.

Logan Conveyors

SOLVE FOUNDRY *FLOW* PROBLEMS

NEW EQUIPMENT and SUPPLIES

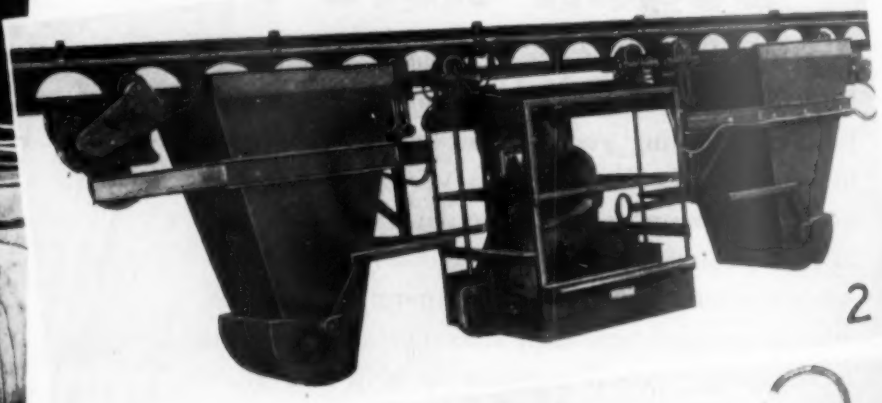
(1)—Cutting Blowpipe: Linde Air Products Co., unit of Union Carbide & Carbon Corp., 30 East 42nd St., New York, has developed a new heavy duty, oxyacetylene blowpipe which cuts steel in thicknesses of 16 to 50 in. It is particularly suited for removing casting risers, as well as cutting of forgings, hot tops, ingots and scrap, including many applications where the oxygen lance was formerly required. The unit is water cooled and is intended to be mounted on a heavy duty, straight-line cutting machine. Cutting-oxygen pressures used are low, never over 35 psi. Satisfactory operation is claimed with an acetylene generator or manifold having minimum hourly capacity of 500 cu ft. Also available is a new blowpipe holder which provides vertical adjustment through a crank-operated worm and gear meshing with the blowpipe rack. Total angular adjustment of 135° can be obtained in the plane of the cut.

(2)—Bucket Carrier: Cleveland Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, O., announces a new motor-driven, cab-operated double bucket carrier for transportation of dry bulk materials. Operation of the carrier and opening and closing the bucket gates are handled by the cab operator who sits on a swivel chair, enabling him to work in the direction of either bucket. A single variable-speed drum controller is located on one side of the cab, but two foot brakes are provided at either end so that one is always in convenient reach of the operator. Push-pull levers for opening the bucket gates extend into the cab and permit emptying materials in any amounts and at any rate desired. The unit illustrated has two 25-cu-ft buckets and is designed to carry a total load of 2 tons. Other size carriers can be supplied.

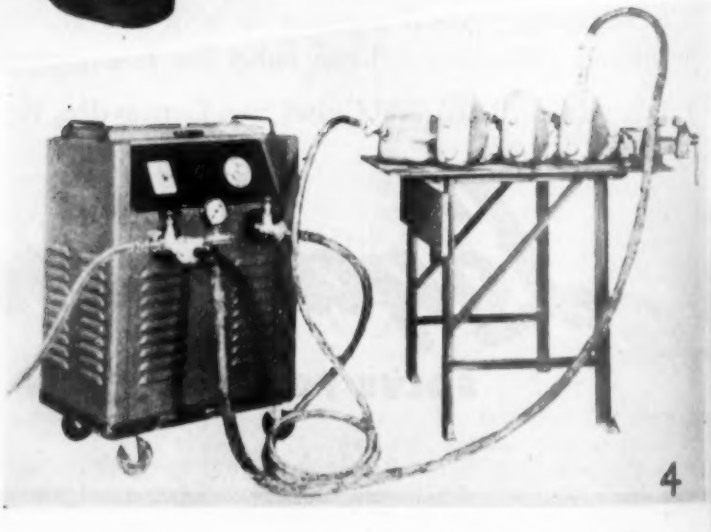
(3)—Work Holder: Metro-Vise Co., 251 Stephenson Bldg., Detroit 2, Mich. is offering an improved model of its Metro Positioner used in holding work during machining or assembly operations. Purpose of the new model is to simplify tilting of work during assembly operations by permitting adjustments without necessity of stopping to manipulate a wrench. The plate, to which a vise or fixture is bolted, is integral with a ball turning in the socket formed by two babbitt clamping jaws, so shaped and pivoted as to maintain a firm grip but so tensioned as to let the ball roll in the socket when a change in tilt angle is desired. A heavy tension spring actuates the two clamping jaws, providing sufficient pressure to hold the ball steady during normal assembly work but making it instantly responsive to simple hand pressure for movement at any angle and in any direction. Tension of the spring can be adjusted to the character of the operation being performed. The unit is available in two sizes.

(4)—Casting Sealer: Metallizing Co. of America, 330 West Congress St., Chicago 7, Ill., has developed a new unit for circulating Mogul Cast-Seal solution under pressure through castings which develop porosity. The solution builds up successive interlocking layers in pinhole cracks to seal openings

(*Continued on page 252*)



2



4

REVOLUTIONARY

NEW CRUCIBLE MELTING FURNACE WITHOUT BURNERS In Furnace Body

Seems impossible doesn't it? But nevertheless it is being done with amazing results in several foundries.

This furnace is fired from the top through the cover . . . the flame is directed away from the crucible and made to wipe the whole inside periphery of the furnace walls with a sheet of flame. Thus, it gives pure radiant heat.

Developed over a period of 2 years, this furnace is now ready for production.

Let us tell you the 18 reasons why you cannot afford to operate the old conventional tangentially fired furnaces.

Radiant Combustion, Inc

BUILDERS OF EVERY TYPE (OIL, GAS, ELECTRIC) OF HEAT TREATING FURNACE

WARREN, OHIO

ESTABLISHED 1905

Strand
FLEXIBLE SHAFTS

FORTIETH YEAR 1945

HIGH QUALITY
FLEXIBLE SHAFT MACHINES
ONE HUNDRED TWENTY-FIVE TYPES AND SIZES, 1/8 TO 3 H. P.

HORIZONTAL AND VERTICAL
THREE SPEEDS OR SINGLE SPEED
MORE THAN THREE HUNDRED ATTACHMENTS.

SEND FOR CATALOG NO. 29

THE LARGEST LINE IN THE WORLD

N. A. STRAND AND COMPANY
5001-5009 NO. WOLCOTT AVE. CHICAGO 40, ILL.

Modern Design...
MEANS
FUTURE ECONOMY!

The modernity of design and layout in your plant or plant expansion project will definitely be a determining factor in the success of your enterprise. The A. A. WICKLAND & Co. has devoted nearly a quarter-century to the solving of the many and varied problems associated with design, construction and operation of modern foundries. Our highly trained staff of engineers is always at your service and will be happy to assist you with any design or construction problems you may encounter. Write or telephone us today!

FOUNDRY ENGINEERS SINCE 1919

A. A. WICKLAND & CO.
ENGINEERING BUILDING • CHICAGO (6)

TELEPHONE DEARBORN 9344

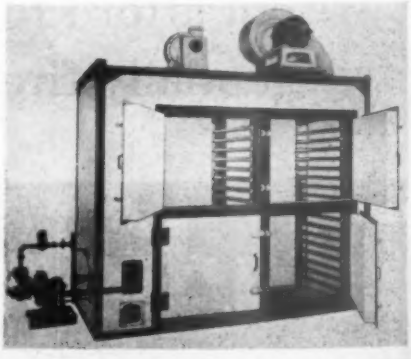
(*Continued from page* 250)

in the casting. The circulator, mounted on rollers, consists of a cabinet housing a 15-gal tank with electric immersion heater, and a turbine-type pump equipped with a 1/3-hp 110-v single phase motor. The 30-gpm-capacity pump has an automatic pressure switch which maintains pressure at the setting required by the operator. The unit is furnished with 12 ft of cable for heater and motor and two 12-ft lengths of safety hose for attachment to the casting, also air pressure gage, air control petcock and 2 ft of air hose fitted with air connector for pressure testing.

Crucible Furnace: Fen Machine Co., 1350 Babbitt Rd., Cleveland 17, has added an automatic air lift to its

Iler crucible draw furnace for opening and closing the unit. The valve may be located at any point convenient to the operator. The furnace is divided on an inclined plane into two parts hinged at the back. The lower section contains the burner for either gas or oil. A closed passage built into the wall of the lower section conducts the air from the blower to the burner. It is claimed that this preheated air effects a saving of 20 per cent in consumption of natural gas and a correspondingly greater saving with fuel oil. Raising or tilting the upper part of the furnace allows quick, easy access for charging or removing the crucible. Neither tongs nor overhead handling equipment is needed.

Cabinet Oven: Gehnrich Oven Division, W. S. Rockwell Co., 50 Church St., New York, 7, has developed a shelf loading oven with a self contained heat-



ing system. It is claimed that this type of oven or dryer combines the low first cost advantages of an internal heating

(*Continued on page* 254)

NEW AO SPAT

Offers Maximum Protection and Convenience

This newly designed spat—AO 4903—affords excellent protection for the instep and ankle of foundry workers. It is available in chrome leather, specially tanned to resist heat and hot metal splashes, and may also be obtained in asbestos or fire resisting duck. All spats have a chrome leather flare over the instep.

The spat can be quickly adjusted in three easy steps:

1. Adjust heel strap, by means of snap fasteners, to fit under instep close to heel of shoe.
2. Insert steel stay into pocket at bottom of spat.
3. Fasten spat at top by reversing position of hands, one hand holding back of spat at top, and the other hand pulling tab to proper snap fastener adjustment.

Immediate release is obtained simply by grasping tab at top of spat, and pulling forward quickly which releases entire spat.

AO makes a complete line of protective clothing —gloves, mittens, jackets, pants, spats, etc. Write for descriptive literature.

American Optical
COMPANY
SOUTHBRIDGE, MASSACHUSETTS
BRANCHES IN PRINCIPAL CITIES

IMMEDIATE DELIVERY

on the

NEW

"RAPID" HAND SQUEEZER

$122.00

Will handle a lot of your bench jobs and save you money by trebling your production.

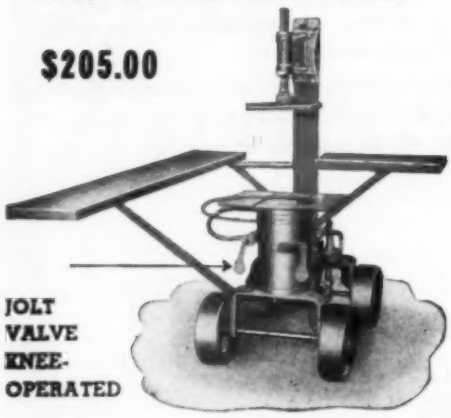
Handles flasks up to 18 x 30 inches. Comes complete with benches. Portable or Stationary Type.

★

"RAPID" R9X JOLT

30% increased jolt capacity

$205.00



JOLT VALVE KNEE-OPERATED

A Foundry producer of good molds for over 20 years.

Simple to operate.

Squeeze Plate quickly adjusted. Low initial cost.

★

Write for NEW descriptive folders and Price Lists.

PIONEER

MANUFACTURING CO.

Molding Machine Manufacturer for Over 20 Years

MILWAUKEE (West Allis) WISC.

(*Continued from page 252*)

system with air recirculation in a heat processing chamber that can be made any desired size with any number of shelves or trays. A line type gas burner connected to a motor-mix proportioning unit, complete with motor and air safety control valve fires into the combustion chamber. If electric heating is prefered, ribbon heaters may be mounted in the combustion space. Heat from the burner is drawn upward by a large fan on the roof. The heated air is forced through a duct on the right side of the oven and then through adjustable slides louvres across the full width of the oven and finally through the combustion chamber for recirculation.

Positioner: Ransome Machinery Co., 1449 South avenue, Dunellen, N. J., announces a sturdy and compact hand-operated positioner for production and repair welding, assembling, overhauling, grinding, drilling, etc. Capacity is 100 pounds, center of gravity 3 inches above the table, tilting range 150 degrees, revolving range 360 degrees. Can be locked at any degree of tilt. The 16-inch table top is equipped with ⅝-inch slots. Swivel base is available. The company manufactures positioners from 100 pound capacity hand operated, to 40,000 pound motor operated, also turning rolls and other special positioning equipment.

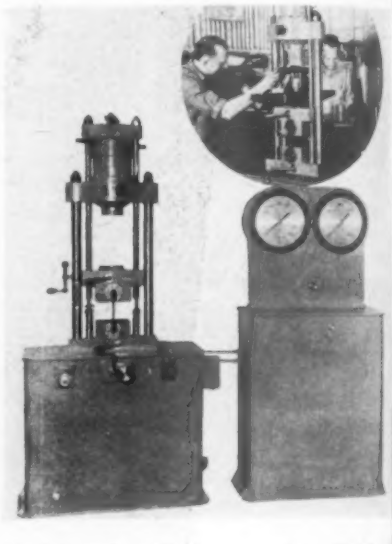
Battery Charger: Electric Products Co., Clarkstone Rd., Cleveland 12. O., has developed a single-circuit battery for charging one battery at a time, and a four-circuit charger for one to four batteries. Automatically, the charging current begins at the proper value and is controlled throughout the charge at rates established by the electric truck and battery industry. The equipment shuts down in case of power failure. When power is restored, charging resumes, and the charger shuts down completely when battery is charged fully. No manual attention is required during the operation.

Electrodes: Sight Feed Generator Co., Richmond, Ind., has developed a line of overlay electrodes for surfacing built-up portions of worn-away ferrous metals and alloys. They are offered in sizes ⅛, 5/32, 3/16, and ¼ in. and in various grades, and are said to operate equally well on alternating or direct current. Coated with metal which blends with the core rod, the electrodes will not become brittle after application but retain their original hardness throughout use.

Fire Extinguisher: American-LaFrance-Foamite Corp., Elmira, N. Y., announces a fast-acting portable fire extinguisher made in three sizes, using carbon dioxide as the agent. The operating valve lever is directly above the carrying handle. It can be instantly opened by pressure of the hand grip and closed by its release. For continuous operation the D-yoke ring is slipped over the operating lever while it is depressed.

Electrode Holder: General Electric Co., Schenectady, N. Y., announces a new armor-clad (screw type), fully insulated electrode holder with head completely enclosed in a sheath of aluminum armor which protects the insulation, resists weld spatter, and eliminates possibility of accidental contact with welding circuit. Designed to accommodate electrodes up to and including ¼-in. diameter, the holder weighs 15 ounces, and is unusually cool in operation. Width of the electrode slot limits the size of the electrode which can be inserted, preventing overloading.

Testing Machine: Steel City Testing Laboratory, 8843 Livernois Ave., Detroit 4, announces a new hydraulically-operated testing machine in which the



piston and cylinder are lap finished without packing. The pulling head unit thrust is taken on a large steel ball and socket. Upper and lower pulling heads are of the conventional type. A load regulating valve maintains a uniform load rating. Maximum stroke of cylinder is 6 in. and maximum span of the traverse table is 30 in.

Deburring: De Burr Barrel Co. Inc., 4577 Hollywood Blvd., Los Angeles 27, Calif., has perfected a process for deburring of precision parts, imparting a uniformly smooth overall finish as well. De Burrettes, used in tumbling barrels, are made of soft rubber impregnated with aluminum oxide abrasive. Their constant, even sliding pressure on the metal provides fast cutting action on hardened steel. Tolerances are easily controlled by timing the run. No water is used.

Cutting Tools: Crobalt Inc., Ann Arbor, Mich., is introducing a new solid

(*Continued on page 256*)

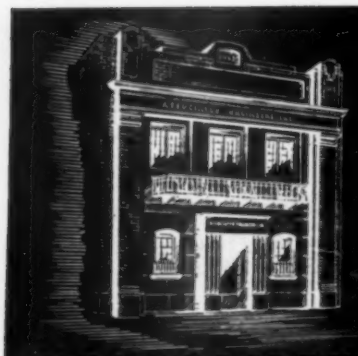
Carries a lot of weight for all its lightness . . . . .

"Alcoa" on the aluminum ingot and pig you purchase means accuracy of analysis—more certain results in your foundry. It carries assurance of uniformity and freedom from inclusions.

Alcoa is glad to share with foundrymen the skill which comes from 57 years of manufacturing experience. For help on your metallurgical problems, call on ALUMINUM COMPANY OF AMERICA, 1823 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM**

ALCOA ALUMINUM



MANAGEMENT COUNSEL

Our services provide the combined talents of registered licensed, professional industrial and mechanical engineers, accountants, architects, structural, civil and hydraulic engineers, electrical, heating, ventilating, air conditioning, chemical, foundry and metallurgical engineers to work closely with members of your staff in helping to build a more effective business organization.

Illustrated folder on request

- Industrial Engineering
- Methods
- Plant Layout
- Production Flow
- Work Standards and Costs
- Job Evaluation
- Wage Incentives
- Architecture
- Structural Engineering
- Civil Engineering

The successful future of many a business hangs on the thread of making a decision to do something today

ASSOCIATED ENGINEERS, INC.

Joseph C. Lewis, President

230 EAST BERRY STREET
Fort Wayne 2, Indiana

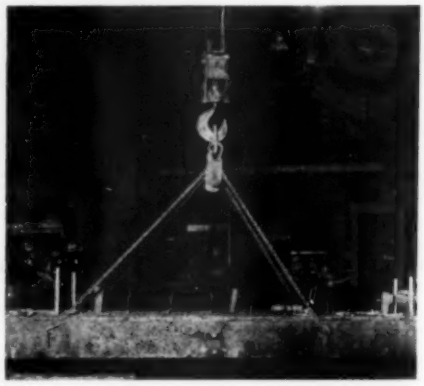
AEI

(*Continued from page 254*)

cast steel cutting tool, supplied hardened and ground, ready for use. It is produced by melting a special cobalt steel alloy, superheating to well above 3000 degrees Fahr. and casting in molds of the approximate tool size. This process is said to give the metal a preferred grain and carbide particle size at the time of casting, thus doing away with the need of forging and later heat treating. The tools are available from stock in 9 standard sizes of square bits and 5 sizes of rectangular bits.

Rust Remover: Waverly Petroleum Products Co., Philadelphia 6, has developed a new pickling agent called Troxide, to remove rust, scale, tarnish, and incrustations of cement and lime from metals. The new chemical, which is a dry, inert compound, throws off no toxic fumes harmful to workmen and machinery, and attacks the scale, not the good metal, leaving surfaces smooth, clean and bright. It can be used to clean and reclaim ferrous, nonferrous and precious metals and metal parts.

Lift Slings: Hercules Sling Co., Rockford, Ill., has introduced a complete line of automatically equalizing chain slings in 4, 7, 14, 25 and 40 ton capacities, and with a safety factor of 4 1/4 times the design load. The block or chain equalizer is placed on the crane hook and the operator spots the hook over the approximate center of gravity of the load. As the crane hook rises the slings chain automatically adjusts itself through the equalizing unit. A brake prevents slippage.



Apron: B. F. Goodrich Co., Akron, O., is offering a heavy duty apron, made acidproof by treating the fabric with a new plastic, which can be easily washed or cleaned without harm. The apron is 35 x 47 in., weighs 1 3/4 lb., complete wiith sturdy 7/8 in. wide tape, criss-cross shoulder design, and attached with reinforced grommets at top and side.

Strapper's Glove: Industrial Gloves Co., Danville, Ill., announces a special glove for operators of strapping machines, made on the flexible, comfortable, seamless palm pattern with extra palm patch of chrome tanned cowhide. The base glove is grain leather, and finger and thumb ends are left open to increase flexibility and permit the easy picking up of tape, or wire, small tools, etc. The glove, with the back left open for coolness, is made in sizes for men and women.

Gear Shift Drive: Lima Electric Motor Co., Lima, O., is offering a selective four-speed gearshift drive designed to power machine tools and other equipment requiring motor capacities of 1 horsepower or less. Weighing only 85 pounds, the unit is designed for continuous operation, with ample overload capacity. A semi-enclosed, drip-proof, ball bearing motor of either 2 or 3 phase, 50 or 60 cycle, 220, 440 or 550 volts is furnished as a standard integral part of the unit, which is rated at ½ and ¾ hp at 1200 rpm and 1 hp at 1800 rpm.

Propeller Fans: Trane Co., La Crosse, Wis., has enlarged its line of propeller type fans to include new models and sizes. The fans are now obtainable with either two or four-blade propellers with direct or belt drive. The two-blade fans are available in sizes ranging from 15 to 48 in. diameter. Four-blade fans start with 10-in. diameter and extend through 72 in. Both belt and direct drive fans may be obtained with the motor outside the air stream. A new cradle type of fan mounting in a wide range of sizes of either type propeller is also being built. Standard fan motors and bearings are available.

Bench Furnace: Surface Combustion Corp., Toledo 1, O., is introducing a three-way bench type universal laboratory furnace adaptable as a direct-fired oven unit, 300 to 2400 F, for direct heating with muffle placed on hearth, or if atmosphere is desired, with diamond block in muffle. Removable plug built into the arch provides a means of inserting a pot. Annealing, carburizing, hardening, cyaniding and tempering, with or without furnace atmosphere can be handled by the one unit. Dimensions are as follows: Hearth, 6 x 12 in.; door, 5¼ x 4¼ in.; overall dimensions 19½ x 21⅝ x 29 in.

Welding Electrode: Harnischfeger Corp., Welding Division, Milwaukee 14, Wis., is introducing an all position mild steel electrode for welding and repairing cast iron. It fuses well with mild or medium carbon steel, making it suited for joining cast iron with other types of steel. With a yield point of 50,000 psi, the deposited metal has an ultimate tensile strength of 60,000 psi. The electrodes are usable with either ac or dc machines.

Hoist Drive: General Electric Co., Schenectady, N. Y., announces a new hoist drive for cranes which is in-

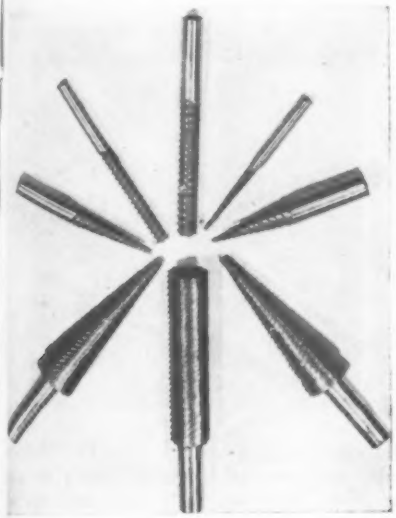
(*Continued on page 258*)

The PATTERN SHOP

Rely on Kindt-Collins to serve you with the finest products on the market — order direct for factory-fresh stock at the most advantageous prices.

Save time, labor and money with Kindt-Collins MASTER Milling Cutters.

A new line made especially to Kindt-Collins specifications, of high speed tool steel, ground after hardening. Cut clean sharp chips in hard or soft woods, and in soft metal — no dust. Cutters available in various shapes, diameters and tapers, ranging from ¼″ to 1″ diameter, 1½″ to 3¾″ long, with



0-2-5-8° taper. Can be reground many times, always assuring sharp, hard, tough cutting edges. Improve the quality of your cutting and finishing jobs—write for MASTER Milling Cutter prices and details.

MASTER Core Plate Dowels

For dependable performance on core blower assembly work. Designed so that the body of the pin can be inserted into core plates up to 13/16″ thick. Made in one size only. The pin diameter is ½″, the length of the pin is 2½″ with a 1½° taper on each side.

A Superior Pattern Coating

MASTER Pat-Kote is a new and improved type of pattern coating, offering many advantages over other and old-style coatings.

1. **MASTER Pat-Kote is easily applied and produces a high grade, durable finish—does not raise the grain of the wood.**
2. **It is moisture resisting and is not affected by water, core oils or acid.**
3. **It has unusual sand abrasion resisting qualities. It dries hard and will not stick in warm sand.**
4. **It dries over MASTER Wax Fillet just as readily as over wood.**
5. **MASTER Pat-Kote is ready mixed. Furnished in Clear, Clear Orange, Black, Yellow, Vermilion, Aluminum Grey and Green.**

Write for descriptive literature and prices to the Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11.

MASTER Coating Containers

These are sturdy new-design containers, built of heavy aluminum to endure plenty of abuse. Will not discolor coatings or shellacs. Brushes are hung from a cross-bar support inside the can. This cross-bar can be readily removed for cleaning. The cone-shaped top covers both brush and coating, preventing evaporation. One and two-quart sizes. Write for container prices.

Progress

More than a quarter-century of progress has been made by the Kindt-Collins Co., during which time we have announced many new and exclusive developments to help the pattern-maker improve his art.

Efficient New Glue Pot

A new glue pot of many uses has been developed by the Kindt-Collins Company. It is completely automatic, permanently wet, has no hot spots, and maintains a uniformly low temperature between 142° and 162° F., holding evaporation to a minimum. The pot comes to temperature from a cold start, full of glue, in 30 minutes, and costs only .6 to 1 KW per 8-hour day to operate with a full pot of glue. It holds two quarts.

The MASTER heating pot is employed for the heating of coatings, wax, low-melting-point metals and certain types of plastic material. Write the Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11, for Catalog No. B-4 and prices.

Use the Right Glue!

MASTER Flake Glue provides maximum adhesion for pattern shop operations. The flakes are thin and water absorbent, dissolving quickly to form a light amber, almost transparent fluid. Available in 90 pound bags. Write for prices and recommendations on the proper preparation of glue.

THE KINDT-COLLINS CO.

Everything for the Pattern Shop

12651 ELMWOOD AVE. • CLEVELAND 11, OHIO

2 reasons why

CAST IRON WELDING EFFICIENCY CAN BE INCREASED

AGILE Yellow
CAST IRON ELECTRODES
Without Pre-heating

These electrodes have a low striking voltage. The part to be welded needs *no pre-heating* and in many cases it can be welded without dismantling the unit of which it is a part. The weld deposit has greater strength than cast iron and is easily machineable.

AGILE Black
CAST IRON ELECTRODES
With Pre-heating

Where machineability of the weld metal is not required the use of AGILE BLACK electrodes is recommended. The weld deposit is much stronger than cast iron and possesses great ductility. In most cases pre-heating is advisable.

Write today for Free Catalog

AGILE ACTARC

AMERICAN AGILE CORPORATION
5806 HOUGH AVE.
CLEVELAND 3, OHIO

(*Continued from page 256*)

tended to provide the maximum safe speed without overload. It is designed for use on indoor overhead, slow or high-speed cranes, operable from alternating or direct current. All braking is accomplished electrically, the power being returned to the supply system instead of being dissipated in resistors.

Heaters: Herbert H. Davis Co., Cicero, Ill., announces a new line of direct fired heaters for commercial and industrial application, in capacities from 75,000 to 2,000,000 Btu output per hour with oil, gas or coal. The steel, self-contained units are equipped with automatic control systems. Unit is shipped in two sections for handling without a crane. Filters may be applied without special transformations. Lower resistance through heater insures quiet fan operation and lower horsepower. Tubes may be cleaned while standing on floor. Unit occupies minimum floor space. The unit has self contained automatic thermostaticallly controlled humidification.

Laboratory Hot Plate: Lindberg Engineering Co., 2450 W. Hubbard St., Chicago 12, has redesigned its line of laboratory hot plates with working temperatures from 110 to 950 F (43 to 510 C). The electrical input control is mounted in front of the hot plate in three sizes 10 x 12, 12 x 20, and 12 x 30 in. Extra heavy special metal top plates, it is claimed, resist growth and warpage corrosion and discoloration. The hot plates are equipped with coiled nickel-chromium elements and refractory type element holders enclosed on all sides by heavy layer of insulation. The assembly is protected by a heavy metal housing providing a deep chamber beneath the element insulation for the internal wiring and terminal boards.

Anti-fog Preparation: American Optical Co., Southbridge, Mass., has developed a new preparation for keeping goggle lenses, face shields and welding plates clear of fog. The new material penetrates the ultramicroscopic pores of glass and deposits a thin film which helps prevents fogging, steaming and frosting of all types of glass surfaces. Also removes grease and dirt. Material is available in one-oz or in one-lb jar.

Lubricant: Carbide & Carbon Chemical Corp., 30 East 42nd St., New York 17, announces a new internal combustion engine lubricant, presenting properties different in many respects from petroleum derivatives. Pour points of the wax free material varying from 30 to 80 F. Flash point up from 300 F. Density approximates that of water. Carbon residue values are less than 0.01 per cent. Change of temperature has little effect on viscosity. It is claimed that the new lubricant practically eliminates sludge and varnish formation in the engine.

Band Saw Guide: Safety Division of the Boyer-Campbell Co., 6540 Antoine St., Detroit, 2, has developed a band saw guide and metal safety guard adapted for use with wood, metal or plastics and for blades ¼ to 1½ in. wide. Side guide wheels are staggered to prevent binding; a grooved back wheel holds the saw in position and double sealed ball bearings help to insure smoothness and accuracy of operation. Positive adjustment of mounting arm on supporting bracket is provided by a set screw that exerts pressure against a 90° pin which in turn presses against the adjusting screw, thus eliminating any tendency to loosening or creeping. Two other models of the same design are available for smaller saws.

Conveyor: Bosworth Engineering Co., 6713 Denison Ave., Cleveland 2, has placed on the market an endless belt loader to be placed in position and operated by one man in handling anything from 300 mesh material to 2 x 8-in. coal. Belt can be supplied in 8 or 11-in. widths and in overall length 14 ft 6 in. Can be supplied in special lengths up to 20 ft and for elevations

varying from 5 to 15 ft. The device may be powered by small motor or gas engine. It is claimed the capacity of the 8-in. belt is 50 tons per hour and that of the 11-in. belt 60 tons of coal or corresponding material.

Welding Electrode: International Nickel Co., Inc., 67 Wall st., New York, announces a new welding electrode suitable for ac and dc welding of wrought or cast Inconel. Characterized by improved arcing qualities, simplicity of slag removal and the ability to make crack free welds in any thickness, the electrode may be used on either straight or reversed polarity with dc generator sets.

Maintenance Paint: Peninsular Chemical Products Co., 6795 East Nine Mile Road, Van Dyke, Mich., has developed a new general purpose maintenance paint for use in plating plants and other high humidity locations. It can be applied by brush, dip or spray. Brick, wood, metal, paint and all other

(*Concluded on page 260*)

. . . . for BETTER castings

and LOWER flask preparation costs

Thor PNEUMATIC SAND RAMMERS

The powerful, steady blows of Thor Pneumatic Rammers packs sand in molds and flasks *solidly* for more uniform castings. These fast, easy-holding tools lift and carry their own weight to reduce worker fatigue and ramming costs far below anything possible with hand ramming. Thor valve design uses effectively *all* the air that enters the tool to provide tremendous power with low air consumption. Made in both bench and floor types, Thor Rammers can be equipped with either butt or pein. Write today for Catalog 52-B.

INDEPENDENT PNEUMATIC TOOL COMPANY

600 West Jackson Boulevard, Chicago 6, Illinois

Birmingham Boston Buffalo Cleveland Detroit Los Angeles Milwaukee New York Philadelphia
Pittsburgh Salt Lake City St. Louis San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

(*Concluded from page* 258)

surfaces, wet or dry, may be covered. Even in the most humid atmosphere it is claimed the paint dries to a hard semi-gloss finish in 30 minutes. The new paint is odorless and extremely resistant to acids and alkalies. Standard color is medium gray, but other colors are available.

Dolomite Throwing: Blaw-Knox Co., 2097 Farmers Bank Bldg., Pittsburgh, announces the manufacture of an improved dolomite throwing machine. Full details are presented in Bulletin 2047. Throwing mechanism and hopper are mounted on a self propelled carriage. The power cable may be plugged in at stations near the furnace or by built in diesel generator units. Built to withstand rough handling, improvements have been made in the drive mechanism, the material throwing mechanism and the general construction. Operator's range of vision is increased. The stream of dolomite is under complete control. Motor speed may be adjusted to control the trajectory, also elevation of the stream and right and left movements.

Grinding Wheel: The Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Conn. has developed a method for giving grinding wheels a case hardening that reduces sintered carbide tools and other superhard metals and thus brings difficult grinding operation within the capacity of regular workmen working under ordinary shop conditions. It is claimed that the active life of the processed wheel is increased from five to twenty times on all metals and alloys whether in precision grinding or in roughing out. The hardening process coats the grain of the wheel, and, under the pressure and heat of grinding, this coating changes into a surface layer of extreme hardness.

Infra-Red Unit: Carbomatic Corp., 7775 Broadway, New York 19, announces the availability of two new portable infra-red units for use with reflector type 6 or 12 lamps in any size from 125 to 375 watts. These portable units are made of heavy gage metal, rigidly constructed with complete flexibility for adaption at any angle or in any position.

Publishes Methods For Foremen

National Foremen's Institute Inc., Deep River, Conn., has published two manuals designed to aid foremen, supervisors and executives in the responsibility of getting out the production needed in peace as well as war. "How To Train Your Assistants," and "What The Foreman Needs For Success," are offered in manual form at 25 cents each.

Identifying Patterns Aided By Tacker

Use of a one-hand tacker simplifies a system of identifying and storing foundry patterns, particularly those which are not used frequently. If the pattern is made of wood, it can be marked by tacking a tag or label directly on the pattern, the tag to show the section, shelf or compartment number, as well as markings that will identify

the piece, its model, kind, use, and company or department to which it belongs.

If the pattern is metal and storage shelves are wood, labels can be tacked to the shelves, and proper identification made on the patterns by affixing a label or by marking the metal with an etcher or marker.

The tacking operation can be quickly and easily done on wood patterns or shelves with the one-hand tacker illustrated, made by the A. L. Hansen Mfg. Co., 5075 Ravenswood Ave., Chicago 40. This device is light weight and holds a strip of 84 two-pointed tackpoints at one loading. Operated with one hand, it leaves the other hand free to hold the tag in position.

Index to Standards Issued by ASTM

American Society for Testing Materials, 260 South Broad St., Philadelphia 2, recently isssued its annual *Index to ASTM Standards*, which lists some 1200 standard specifications contained in the three volumes of the society's 1944 *Book of Standards*. Items are listed under appropriate key-words of the subject covered, and in addition a list is given of specifications and tests in numerical sequence of their serial designations.

Anniversary Marked By Grede Foundries

A 25th anniversary dinner in honor of William J. Grede, founder and president of Grede Foundries Inc., Milwaukee, was held Aug. 13 at Milwaukee Athletic Club. Honored guests included 53 employees with 20 or more years of service. Twenty-five-year lapel pins were presented to Mr. Grede, who began his career as a foundry owner at the age of 23 when he took over the Liberty Foundry in Wauwatosa in 1920, and to the following employees of the four foundries which now comprise Grede Foundries Inc.: Walter Joers, Walter Lambrecht, Michael Mayer and Daniel Siefert of Liberty Division, Wauwatosa; Joseph Gallitz, Edward Gottschalk, Helen Kendall, Otto Larson, Max Plehn, Fred Vick and Oscar Woehlke of Spring City Division, Waukesha; Antonio Barbera, Felix Borkowski, Stanley Groszkiewics, Mike Joswiak, Gaetano Marino, Charles Placek, Harry Strzyzewski and Burton C. Wait, Milwaukee Steel Division; Joseph Krenn and Frank Marciniak of Smith Steel Division.

ASM Plans Veterans' Refresher Courses

The American Society for Metals has planned an extensive program of free refresher courses for returning veterans who entered the service from the metal industry. Objective of the courses will be to bring the individual up to date on all new developments and processes that have taken place during his service, with particular emphasis upon specific phases of the industry of direct interest to the veteran. The program will operate through the 68 local chapters, each of which is selecting a committee to handle the courses.

Offers Charter Text

Clark Equipment Co., Buchanan, Mich., has prepared a handy pocket size booklet containing complete text of the San Francisco Charter, as well as a list of those nations which have already ratified it. Space for recording approval by other nations is provided. Any executive desiring a copy of the booklet may obtain it by writing to the company, on a business letterhead.

Book Review

Conference Leader Training, edited by Edward S. Maclin, president, West Virginia Institute of Technology, and Paul T. McHenry, state teacher trainer, Trade and Industrial Division, West Virginia Department of Vocational Education, 77 pages, published by National Foremen's Institute Inc., Deep River, Conn.

A practical treatise, presenting in concise form the needs for leadership training, techniques involved in planning and leading discussions, methods of planning, leading and directing group thinking, and finally, suggestions for setting up plant conferences. A suggested list of topics for conference discussion is supplied.

Industrial Oven Engineering Co., Cleveland, has opened a branch office in Chicago, located at 332 South Michigan Ave. In charge of the new office are H. W. Munday and F. T. Greaves.

Hydro Whirl

STANDS ON ITS RECORD!

SUCCESS

- GREATER EXHAUST *and* COLLECTING EFFICIENCY
- LOWER MAINTENANCE COST

  Which, *combined, means a Lower Health Hazard*

- LABORATORY TESTS
- ACTUAL PLANT OPERATION
- CUSTOMERS' TESTIMONIALS

  Together *form our Greatest Asset*

- REPUTATION

  "Hydro-Whirl" Dust Collectors, Spray Booths, Metal Parts Washers and Ovens, all or part for your Finishing System.

EVERY JOB ENGINEERED TO THE LAST DETAIL

WRITE, WIRE OR PHONE FOR INFORMATION

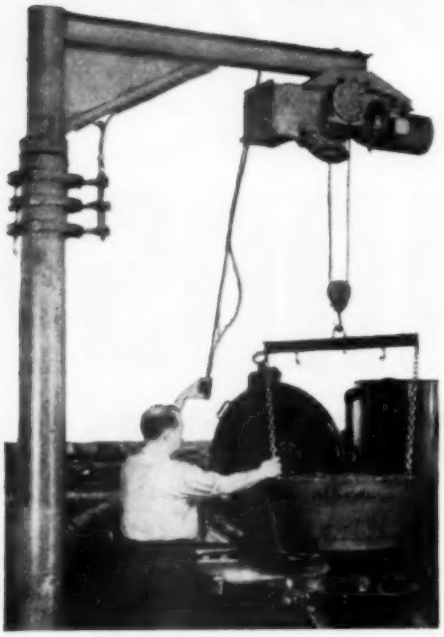
COMPLETE PROCESSING SYSTEMS

PETERS-DALTON *Incorporated*

17902 RYAN ROAD • DETROIT 12, MICHIGAN

HYDRO-WHIRL DUST COLLECTORS AND SPRAY BOOTHS—INDUSTRIAL OVENS, WASHERS AND VENTILATING SYSTEMS

360° JIB HOIST SPEEDS PROCESSING



Here's a materials handling problem that was solved by a Reading Electric Hoist with a 360° swing jib crane. Large quantities of metal turnings were processed for oil removal. Speedy handling was necessary.

A Reading Electric Hoist was selected for power and hoisting speed. Reading engineers also designed the 360° swing for the crane to speed up loading and unloading.

For help in materials handling problems that involve hoisting, write for bulletin, "144 Answers To Your Hoisting Problems".

READING CHAIN & BLOCK CORP.
2108 ADAMS STREET READING, PA.

READING HOISTS

Industry BRIEFS

MONROE STEEL CASTINGS CO., Monroe, Mich., has been acquired by Miller Mfg. Co., Detroit, through purchase of 98 per cent of the former's stock. Joseph W. McDougal, president of Miller Mfg. Co., has been elected president of the Monroe company.

° ° °

Wisnick Accurate Match Plate Co., Chicago, has sold its business and the former owners are retiring.

° ° °

Columbia Steel Co.'s Defense Plant Foundry, Pittsburg, Calif., has been closed and operations discontinued.

° ° °

General Blower Co. has consolidated its Chicago and Morton Grove, Ill., general offices and plants at the latter location in enlarged facilities, where also are now located the general and main sales offices.

° ° °

Building permit has been issued to Floyd M. Bogart for construction of a new foundry building at 6127 Maywood Ave., Huntington Park, Los Angeles, 45 x 96 ft., to cost $6000.

° ° °

Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak., manufacturer of soldering equipment, vacuum cleaners, etc., is moving operations to Moorhead, Minn., where contracts have been let for part one-story 60 x 150 ft. and part two-story 60 x 120 ft. foundry and machine shop to cost about $80,000, with capacity of 25 tons of castings daily. O. G. Schmidt is proprietor.

° ° °

Gaines & Co. is the firm name under which C. D. Perriguey, F. T. Bengel, Esther M. Duval and William J. McGarvey Sr. have published a certificate that they are conducting a foundry business at 4228 Whiteside St., Los Angeles.

° ° °

Hewitt Rubber Corp., Buffalo, has acquired a controlling interest in Robins Conveyors Inc., Passaic, N. J. Thomas Robins Jr., president of Hewitt Rubber Corp., has been chairman of the executive committee, Robins Conveyors, for the last 5 years.

° ° °

Charles M. Hunt and J. B. Lane, Niles, O., are joint owners of the newly-formed Niles Aluminum Casting Co., of that city. The new plant is to be located in the abandoned Niles water works building along the Mahoning river.

° ° °

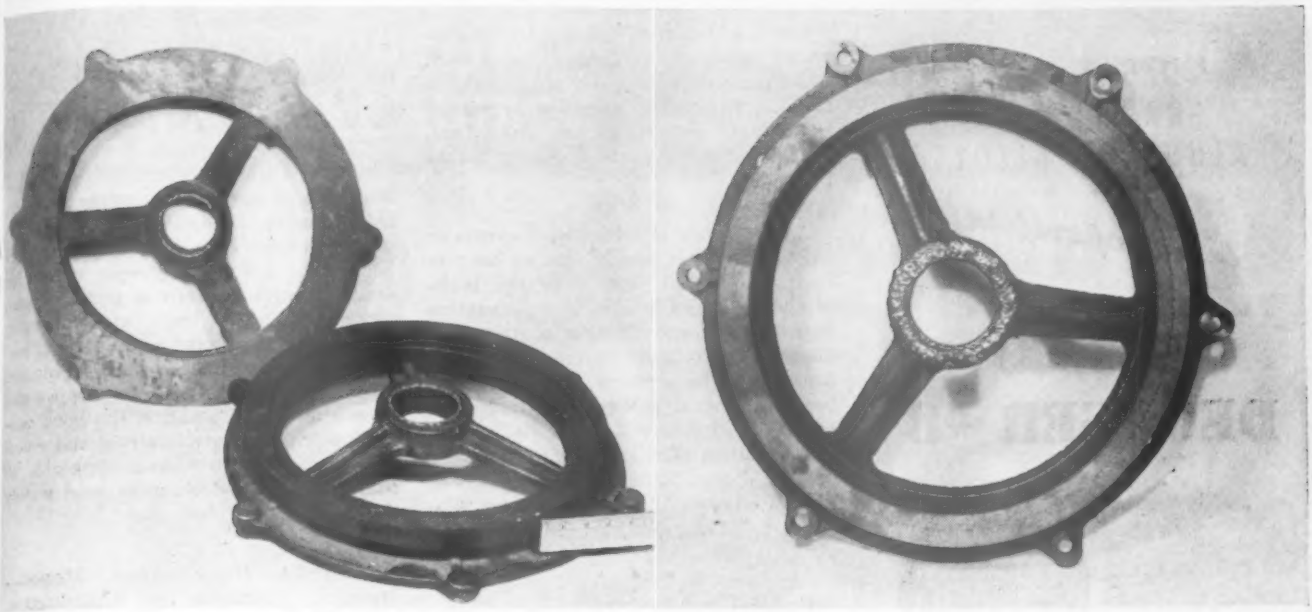
Renkin Pattern Works, 809 Penn Ave., Pittsburgh, has let contract for a one-story shop building, 40 x 100 ft., to cost about $40,000.

° ° °

Orders for foundry equipment placed in July represented 411.7 per cent of the 1937-38-39 monthly average, accord-

(*Concluded on page* 264)

COUNTY FAIR EXHIBIT: Taking advantage of the publicity afforded by the Washington County Fair, Bayport, Minn., Aug. 10-11-12, the Boss Foundry Co., Bayport, Minn., in co-operation with the publicity committee of the Twin City Chapter, AFA, sponsored the exhibit shown here. It attracted many visitors and created considerable interest in the company, its operations and its products. Included in the exhibit were rough and finished castings, an open mold and matchplate, and a sequence showing the manufacture of cores from sand to finished product. (Photo courtesy Herbert F. Scobie)



The bores of these cast iron spiders were built up inside by arc welding with PHILLIPS "600" Electrode. There was no distortion, no shrinkage cracks, and the pieces were fully machinable after welding, including the line of fusion.

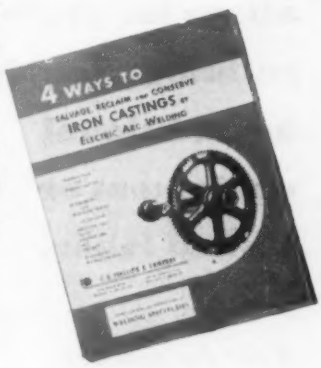
You Can't Afford To Scrap Castings In Peacetime

All signs point to the fact that high labor costs are here to stay. Scrapping castings which contain weldable defects is throwing too much money away. You may be able to salvage material by remelting—but no part of the payroll cost can be salvaged via the scrap pile.

AND YOU DON'T NEED TO SCRAP THEM

Your defective gray iron castings can be salvaged at low cost and made as fit for service as your perfect castings—by arc welding with PHILLIPS "600" Electrode. It takes a little time to learn how, but it's worth it. You get a lower cost on your castings by reducing scrap. You can also use more intricate castings, because when defects occur they can easily and quickly be corrected.

For correcting mistakes or defects, for effecting design changes on castings already poured and machined or for salvaging worn castings, PHILLIPS "600" Electrode offers the advantages of full machinability, perfect color match and low cost of application. Our distributor in your locality will gladly furnish additional information.



C. E. PHILLIPS & COMPANY

2730 Poplar Street, Detroit 5, Michigan • 332 So. Jefferson St., Chicago 6, Illinois

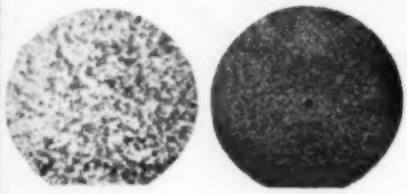
MANUFACTURERS AND DISTRIBUTORS OF WELDING ELECTRODES AND SPECIALTIES

Our "4 Ways" book is a manual of procedures for various applications of metallic arc welding to gray iron castings. Send for your copy TODAY.

DEGAS and
GRAIN REFINE
ALUMINUM ALLOYS

in one operation!

Use
FOSECO
DEGASER #8



Before using After using
Foseco Degaser #8

Introduced a few minutes before castings are poured, it eliminates need for chlorine or nitrogen for degasing—master alloys for grain refining. Requires no additional equipment or skilled labor.

Write for samples, make your own test.

FOUNDRY SERVICES, INC.
280 Madison Avenue
New York 16, N. Y.

(*Concluded from page 262*)

ing to the Foundry Equipment Manufacturers' Association. This compares with 375.4 per cent in June and 375.8 per cent in July, 1944. The gain was accounted for entirely by sales of new equipment, orders for repair parts declining during the month.

* * *

A new series of educational programs emphasizing the possibilities of magnesium was started Sept. 4 by the Hills-McCanna Co., Chicago, in co-operation with the Chicago division of the Dow Chemical Co. and Revere Copper & Brass Inc. The program, to be presented before technical societies and industrial groups, includes talks on the subject of magnesium metallurgy and the metal's uses, a display of magnesium products, and showing of the Hills-McCanna film entitled "Magnesium, the Miracle Metal."

* * *

Foundry Rubber Compounds Corp., Washington, has purchased from Herbert R. Isenburger and the St. John X-Ray Service Inc., Long Island City, N. Y., their permanent mold and die coating business to supplement its line of rubber base pattern, core and mold coatings applicable to wood, plaster, sand and cement types.

* * *

D. & D. Foundry plans an addition to its foundry building at 500 Pine Ave., El Monte, Calif., to cover an area of 20 x 40 ft. Estimated cost is $2000.

Book Review

ASTM Standards on Copper and Copper Alloys, paper, 431 pages, published by the American Society for Testing Materials, Philadelphia 2. Price $2.75.

This book comprises the 1944-1945 edition of a special compilation of ASTM standards on copper and copper alloys as of December, 1944. It includes over 90 standards which are used widely and relate to the following groups: Alloys for sand castings; nonferrous metals (lead, nickel, tin, copper, etc.); wire and cable electrical conductors; plate, sheet and strip; wire rods, bars and shapes; pipe and tubing; methods of tests for copper and copper alloys. In addition the book contains emergency specifications and emergency alternate provisions applicable to those materials which were used widely during the war emergency.

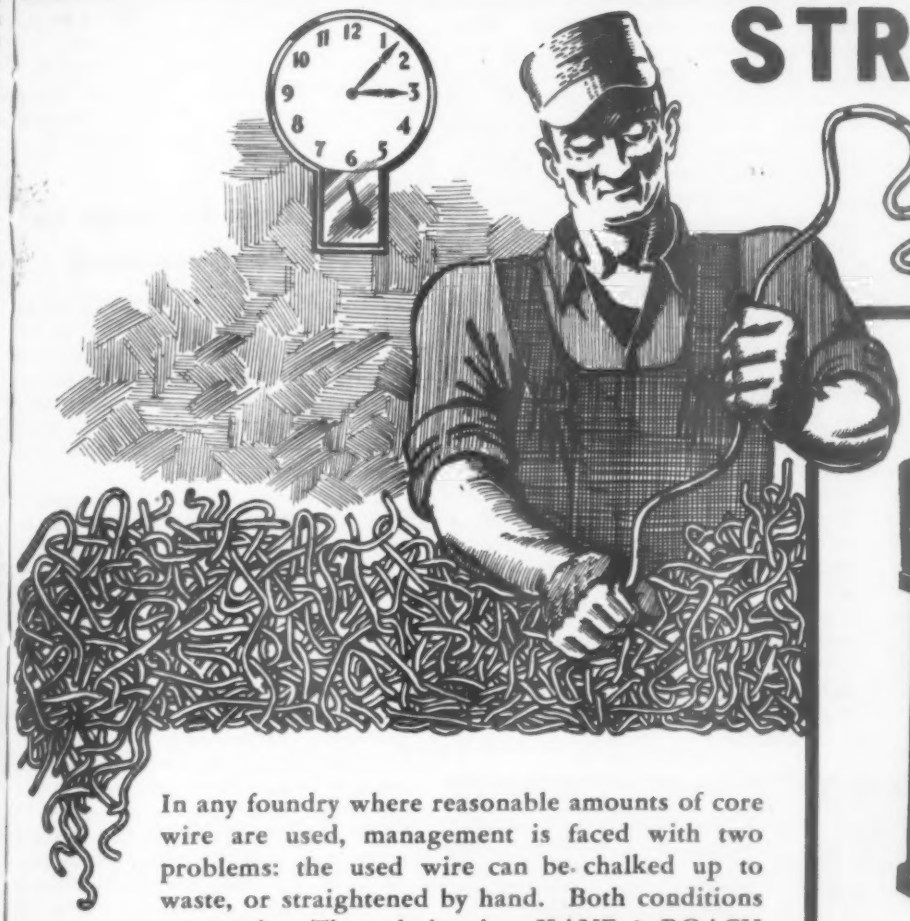
Industrial Housekeeping Manual—Methods, Schedules and Organization, edited by R. F. Vincent, 115 pages, published by National Foremen's Institute Inc., Deep River, Conn. Price $2.50.

This book is addressed to building managers, supervisors and cleaning crew foremen, as a guide in establishing an adequate housekeeping and sanitary work program. Operating instructions and work procedures covered are the result of motion and time studies, field experience, discussions with competent representatives of equipment firms and knowledge of the chemical characteristics of cleansing materials.

SCRAPPING LARGE CASTING: The oxygen lance solved the problem of scrapping this 100-ton steel casting. Lancing was started about 28 in. below the top of the casting, where it was 5 ft. thick. After a hole had been lanced completely through, the cut was continued to the casting bottom. Upon completion of the required number of lance slots, remaining web of material at the top was severed with a standard oxy-acetylene cutting machine. Resulting slabs were then cut again by machine into suitable sizes for shipment. (Photo courtesy Linde Air Products Co.)

Are you paying your coremakers a high hourly rate to **MAKE CORES** . . . . . or to

STRAIGHTEN WIRES?



DX 5-Roll Core Wire Straightener

In any foundry where reasonable amounts of core wire are used, management is faced with two problems: the used wire can be chalked up to waste, or straightened by hand. Both conditions are costly. The solution is a KANE & ROACH CORE WIRE STRAIGHTENER. It reclaims used core wire quickly, cheaply and efficiently, over and over again, just as long as the wire remains usable. Foundries in which they are installed report an average saving of $100. a month in total salvage and man hours, not to mention increased production. Machines can be furnished in two sizes with 5, 8 or 9 rolls. Capacity DX Machine—1/8″ to 3/8″: F Machine—3/16″ to 3/4″. A Shear can be furnished for use with this Straightener for straightening and cutting new coil stock to length. Because we have been building and designing Straighteners since 1887, we feel that our knowledge and experience may help you. We will be pleased to send you specifications and other data on request.

K & R

KANE & ROACH

INCORPORATED
SYRACUSE, N. Y.
ESTABLISHED 1887

Care Required in Melting

ALL NONFERROUS ALLOYS

By FREDERICK H. DAVIS
American-British Chemical Supplies Inc.,
New York

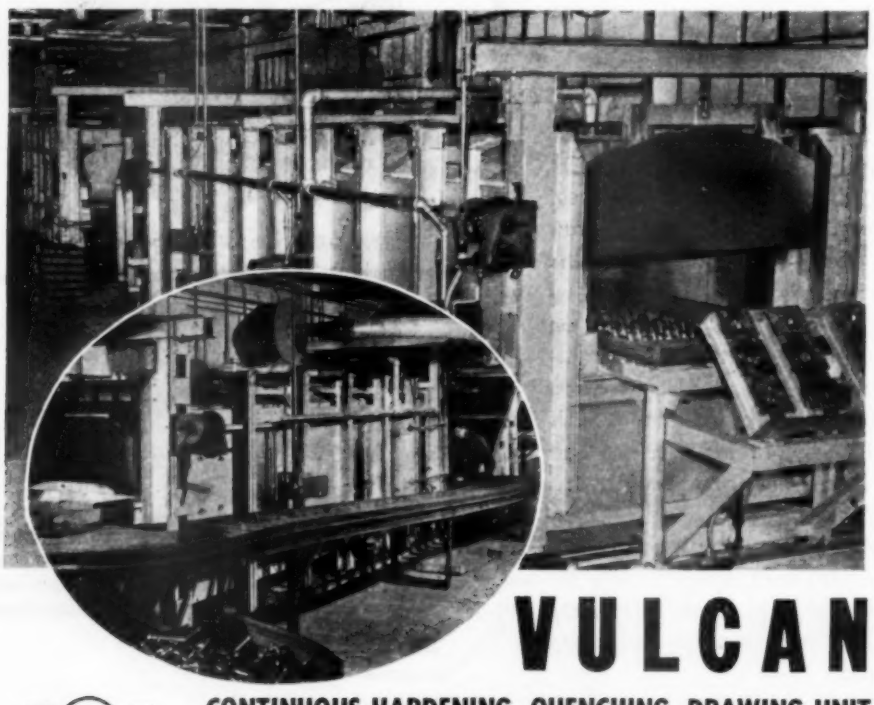
ALL nonferrous alloys should be melted as rapidly as possible. After the metal is melted, the molten metal should be poured as quickly as possible, and not allowed to stew in the crucible or furnace. Do not overheat or oversoak the metal. Do not allow the ingots to be pre-heated *over the hole* in the cover of the crucible furnace. Suitable fluxes should be used to protect and purify during melting.

The atmosphere in the furnace should be slightly on the oxidizing side, or as close to the neutral as possible. Some foundrymen prefer a reducing atmosphere, but this has been found to cause porosity, due to absorption of hydrogen and perhaps carbon dioxide gas by the molten metal. On an oil-fired furnace, the proper atmosphere is indicated by the exhaust flame having a yellow core with a green edge, but to be sure, test the exhaust flame from time to time. By the use of the correct flux, the proper atmosphere is produced in the crucible or furnace.

No hard and fast rule can be outlined for the proper temperature for any particular metal or alloy. Different alloys call for different temperatures, and even the same alloy requires different temperatures, depending upon the size and thickness of the casting. After the maximum pouring temperature has been fixed, metals should not be heated *above* those temperatures. This is especially vital with aluminum alloys. Furthermore, the practice of cooling overheated metals by stirring in dirty gates and risers, scrap, etc., is not recommended. If a small amount of cooling is to be carried out, this should be done by using clean ingot or new metal, and under no circumstances should the cooling be done by means of dirty or impure scrap metal.

Furnaces, crucibles, burner nozzles, tools, pouring ladles, etc. must be kept clean and dry. Stirring rods should be preferably made of graphite. If iron or steel stirring rods, skimmers, ladles, etc. are used, they should be covered with a protective coat or wash in order to remove the possibility of iron pick-up. Crucibles should be scraped clean after each melt and again after the day's work is done. They should also be coated with a protective wash and thoroughly dried before they are used for melting metal. For these protective coatings—ask us for particulars on same.

All foundry fluxes, degassers, deoxidizers or densifiers should be kept in dry place and preferably warmed before using. Moisture should not be incorporated into the molten metal by means of tools, fluxes or additions, because moisture forms steam and steam gives up hydrogen, which is absorbed by the metal and causes porosity.



VULCAN

CONTINUOUS HARDENING, QUENCHING, DRAWING UNIT

Get the details on this fast, efficient furnace for treating miscellaneous castings and forgings. Production: 1000 lbs. to 1500 lbs. per hour.

VULCAN CORPORATION
104 NORTH 17TH STREET, PHILADELPHIA 3, PA.

Advisory Groups to WPB Retained

Industry advisory committees of an over-all type will be retained on an "on call" basis until the War Production Board is liquidated, WPB has announced. However, during the reconversion period, certain industry committees that represent segments of major industries will be dissolved.

The Attorney General has assured WPB that the agency may continue to confer with industry advisory committees "until the time the present authority of the War Production Board under the Second War Powers Act, as amended, terminates."

WPB also announced that certificates of appreciation will be forwarded to 8000 members of the 792 committees now active, as well as to industry members formerly associated with the agency's advisory groups since the first one was formed late in 1941.

The agency emphasized that it would continue to seek the advice of industry members whenever new plans affecting production are to be formulated or changed. WPB will continue to schedule meetings whenever any three committee members make the request and the proposed agenda concerns WPB.

Crane Co. Observes 90th Anniversary

Crane Co., Chicago, has issued a 90th anniversary issue of *The Valve World* to describe the company's progress since July 4, 1855, when R. T. Crane poured his first casting. At that early date his plant was known as "R. T. Crane, Brass and Bell Foundry," but in 1856 a new three-story plant was erected and manufacturing of additional items was started and before the end of the Civil War both an iron foundry and malleable iron foundry were added, the latter being the first in the Middle West. Before the end of the century the company's present name, "Crane Co.," had been adopted. The publication contains numerous illustrations of application of the company's products to various industries, as well as views of shop operations.

Western Stove Co. plans an addition to its plant at 8536 Hays St., Culver City, Calif., 44 x 52 ft., to cost $3100.

An "Open Letter" to Aluminum and Magnesium Founders!

IF you are thinking about problems like these---

CASTING DESIGN
AN ENGINEERED PRODUCT
SERVING NEW ACCOUNTS

In short, if you want to capitalize immediately on the great interest in light metals for a wider variety of peacetime products, *we can help you.*

CHECK THESE CONSULTING SERVICES:

1. Redesign of patterns to use substitute metals.
2. Redesign of castings to use modern alloys.
3. Foundry Quality Control* to make "out-the-door" cost lower.

THEN USE THE ONE YOU NEED TO

1. Speed up reconversion.
2. Fill your foundry to capacity.
3. Increase your income while decreasing your customer's cost.

AND THEN CALL

**ORIGINATORS OF THE X-RAY PLAN FOR QUALITY CONTROL*

X-RAY INCORPORATED

Specialists in Industrial, Metallurgical Radiography

2740 BOOK TOWER RANDOLPH 2544 **DETROIT 26, MICH.**

Chicago Laboratories — 2532 Cottage Grove Avenue

LOW COST
Eye Safety For
Spectacle Wearers

Willson Cover-All* cup goggles give complete protection on eye-hazardous operations. Roomy enough to fit over ordinary correction spectacles.

Direct ventilation prevents lens fogging. Eye cups are transparent for clear side perception. Accurately fitted to facial contours. Leather nose bridge adds extra security.

Designed to withstand impact hazards striking from any angle. Each Super-Tough* lens is given rigid, individual testing. Uniformly heat treated to assure maximum fracture resistance.

For help with your eye-protection problems, get in touch with your Willson distributor or write for further information.

*T. M. Reg. U. S. Pat. Off.

GOGGLES • RESPIRATORS • GAS MASKS • HELMETS

WILLSON

DOUBLE

PRODUCTS INCORPORATED

Established 1870

237 WASHINGTON STREET • READING, PA., U.S.A.

NEW TRADE PUBLICATIONS...

COMPRESSORS: Schramm Inc., West Chester, Pa., offers Catalog 45, describing a complete line of stationary and portable air compressors. The catalog also illustrates trailers, skid mountings, tool boxes, hose reels, crawlers, railcars, motor truck mountings, cooling units, etc. Specifications for compressors and engines are included.

NOZZLES: American Foundry Equipment Co., 500 South Byrkit St., Mishawaka, Ind., has issued a catalog, No. 27, describing three grades of long-life blast nozzles, using steel abrasive, long-wearing ceramic insert, or heat-treated abrasion-resisting alloy steel. Copies of the publication will be mailed to any interested plant.

SAND CONDITIONER: Purity Moulding Sand Co., Dallas City, Ill., has compiled a 4-page folder which contains useful information on a compact efficient sand conditioner. The machine has a capacity of over 1000 lb of conditioned sand per minute at a cost approximating 1 cent per ton for maintenance.

CORROSION RESISTANT MATERIALS: Bulletin H, a 16-page folder recently published by the U. S. Stoneware Co., Tallmadge Circle, Akron, O., describes a line of tanks, lining materials, flexible tubing, gasketing, paints and liquids, stoneware, masonry, mixing equipment and other corrosion-resistant materials developed for specific services.

ELECTRONICS: To provide an understanding of the principles of electronics and their part in future industrial developments, Allis-Chalmers Mfg. Co. 568, Milwaukee 1, Wis., has prepared Educational Bulletin No. 8, entitled "Introduction to Electronics," which discusses the fundamentals of conversion and control of electric power in a load. Differences between a vacuum tube and the equivalent mechanical device, methods of specifying tube performance, application of tube characteristics for design purposes, and use of the high speed response of the tube are explained. Principles of tube oscillators with application to induction and dielectric heating, line drawings, curves, and sketches are presented.

DYNAMOMETER: W. C. Dillon & Co. Inc., 5410 West Harrison St., Chicago 44, Ill., presents in manual form the story of the traction type dynamometer and its uses in simplifying testing and weighing procedures in steel, rubber, aircraft and marine industries. Nine different capacities are pictured and descriptive matter regarding varieties of use is furnished.

PRESSURE CASTINGS: A folder describing a variety of pressure applications with illustrations of faulty and correct design for pressure units is offered by the Meehanite Research Institute, Pershing Square Bldg., New Rochelle, N. Y. Pressure temperature ratings are listed.

LABORATORY SERVICE—Sam Tour & Co. Inc., 44 Trinity Place, New York 6, offers a 4-page colorful folder, which outlines its services and facilities as metallurgists, engineers and consultants. Containing views of the several laboratories housed in the company facilities, the folder lists the nature of assignments undertaken in metallurgical and chemical engineering, metal finishing, corrosion, physical metallurgy and consultations.

BLOW AND SPRAY GUNS—The B. F. Goodrich Co., Akron, O., has published an attractive 22-page catalog, No. 15, on a new line of rubber blow and spray guns and water savers. Explaining the principle of Lonn valves which have only three working parts and give constant finger tip control of air or water under pressure without the use of levers, springs, push buttons, packings or screws, the booklet also contains charts showing cost of air or water delivered through various sized orifices when uncontrolled.

CHROMIUM PLATING—Van der Horst Corp. of America, Cleveland 11, O., has published a 21-page booklet, "Handbook and Data Manual on Porous Chromium," which describes the advantages of the chromium plating process developed by the firm, the methods governing its application, and results that have been obtained.

FURNACES — Lindberg Engineering Co., 2450 West Hubbard St., Chicago 12, Ill., has published bulletins 160, 170, and 201, describing gas fired tool room box type, gas fired production box type, and all-purpose brazing furnaces, respectively. Well-illustrated, these bulletins contain descriptive data, specifications, selection of temperature ranges and cross-sectional views of the furnaces featured.

HYDRAULIC NOZZLES—Worthington Pump & Machinery Corp., Harrison, N. J., offers an 8-page illustrated folder, WP-1099-B43, entitled "Industrial Application of High Pressure Hydraulic Nozzles." Schematic layout of equipment for a complete descaling system, descaling forgings and hydraulic decoking are contained, as well as descriptive data covering application of hydraulic jets.

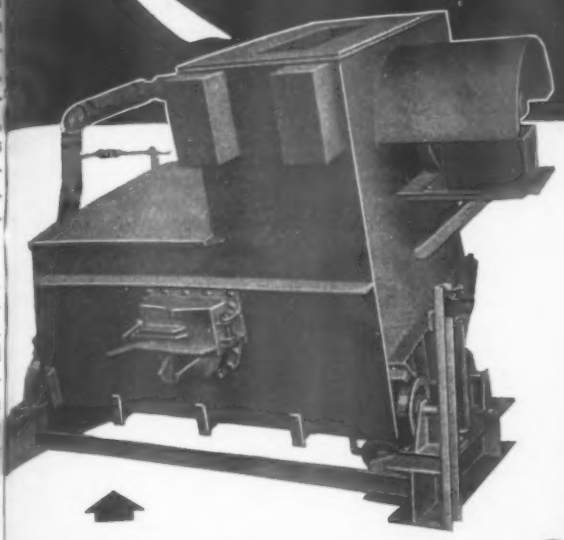
BLAST TABLES—American Foundry Equipment Co., 555 South Byrkit St., Mishawaka, Ind., offers five catalogs describing a complete line of airless blast tables, both multi-rotary and plain table types.

SEPARATOR — Logan Engineering Co., 4900 Lawrence Ave., Chicago, Ill., offers an explanatory bulletin, 445, which describes its Aridifier employed in removal of moisture, dirt and oil from compressed air. Operating details and typ-

(*Continued on page 270*)

Reconvert WITH STROMAN FURNACES!

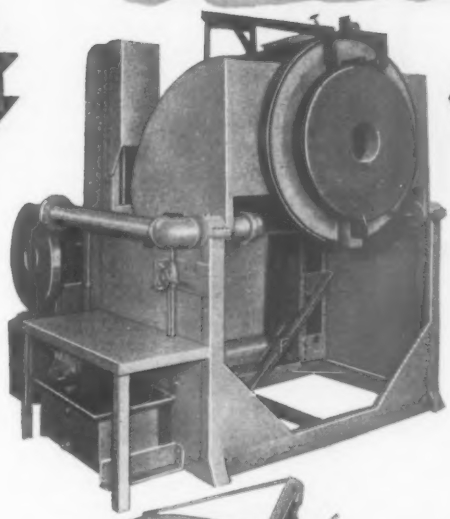
For Fastest Melting ... Greatest Efficiency ... Lowest Fuel Costs ... Specify Stroman for Any Non-Ferrous Metal Melting Job.



SKLENAR NON-CRUCIBLE, DIRECT FIRED, IMPROVED REVERBERATORY MELTING FURNACE

For Melting Brass, Copper, Aluminum, Ferro-Manganese and special cast iron alloys

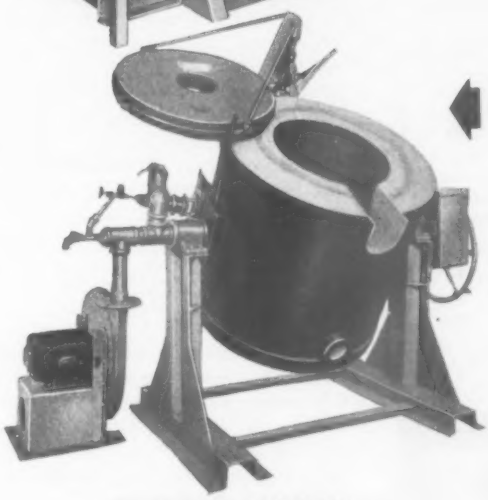
This furnace has won great acclaim throughout the British Empire. Metal is charged into a hopper which is also an exhaust from combustion chamber. Here metal is preheated and melted at the throat of the hopper. Cold metal does not reach the molten bath. Charging is continuous, it is not necessary to shut off flame to charge additional metal. These furnaces melt faster and give greatest fuel economy as combustion chamber is heated by the same fuel used to melt metal in the throat of hopper. It is exceptionally cool for operator to work around. Mechanical or hand tilt. Oil or Gas Fire. Capacities range from 350 to 10,000 lbs.



STROMAN CRUCIBLE HYDRAULIC TILT FURNACES

For Brass or Aluminum

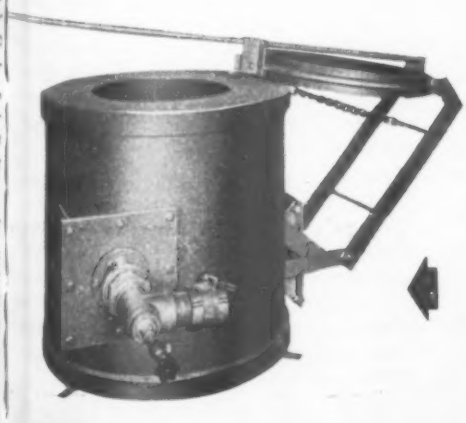
These hydraulicly tilted furnaces also embody such features as Stationary Lip Pour, Variable Speed Control, and many other labor saving devices. They are the last word in modern streamline design and efficiency. Push-Back Cover simplifies charging and pouring. Capacities from 150 to 400 crucible.



STROMAN MANUAL TILT CRUCIBLE FURNACES

For Brass, Bronze and Aluminum

The "Old Standby" redesigned and engineered for easier tilting and faster melting are enjoying great popularity in many modern foundries. They will do your job better and effect many economies. Oil or gas fire. Capacities from No. 40 to No. 400 crucible.



STROMAN CRUCIBLE STATIONARY MELTING FURNACES

For Brass, Bronze, Aluminum and other non-ferrous metals

Sturdy, efficient, time saving, and featuring the Stroman Push-Back Cover these stationary furnaces are the leaders in the field. They are tops in fuel economy and daily production. Oil or Gas fire. Capacities from No. 20 to No. 400 Crucible.

STROMAN ENGINEERS WILL GLADLY CONSULT WITH YOU ON FOUNDRY LAYOUT AS WELL AS FURNACE SPECIFICATION. WRITE TODAY for FULL INFORMATION

STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. 300 W. ADAMS ST. CHICAGO 6

SHOT BLAST quickly wears out the ordinary protective cover liners of sand blast machines. In one Michigan foundry, for example, liner life was only 95 hours. Then Coast Metals Hard-Facing was applied, and now liners average 760 hours! Another foundry that faces liner plates with Coast Metals saves $15.25 every 33 days, and eliminates 10 replacements a month.

No wonder more and more plants are relying on Coast Metals Hard-Facing! Because of its resistance to wear, abrasion, shock and heat, it stretches the life of new or worn parts several times. Application is simple—by arc or acetylene welding. Use it on surfaces, edges, points to keep equipment on the job and save shut-downs.

Write for details in pamplet "Your Best Protection Against Wear."

COAST METALS, INC.

Plant and General Offices:
1232 Camden Ave., S.W. Canton 6, Ohio

Executive Offices:
2 West 45th Street, New York 19, N. Y.

COAST
METALS
hard-facing weld rods
MAKE YOUR
EQUIPMENT
LAST LONGER

(*Continued from page 268*)

ical installations are given, together with tables covering air discharge for various sizes of pipe and requirements of different pneumatic tools.

ELECTRODES—Air Reduction, 60 East 42nd St., New York 17, is distributing a new 52-page electrode catalog which is said to be one of the most complete and elaborate books of its kind ever issued. The book contains a combined electrode selector chart and index, illustrated sections on mechanical properties and testing and on approvals. A reference section at the back of the book offers information on plate edge preparation, estimating electrode requirements, welding symbols, hardness conversion table and glossary of welding terms.

OVENS—Gehnrich Oven Division, W. S. Rockwell Co., 108 Jewel St., Brooklyn 22, N. Y., has published two catalogs, 115 and 116, pictorially descriptive of uniform heat treatment of ferrous and nonferrous products, and heat distribution methods, respectively. In the first catalog, aging, air tempering, annealing, bluing, drawing, heat treating, normalizing, preheating, stress relieving and other heat processes are described. In the second, a dual panel assembly is explained in detail, together with oven doors, heat supply systems, gas, oil, electric, steam, coke and infra-red energized, and a study of oven problems and handling problems are discussed.

GRINDING EQUIPMENT — Fox Grinders Inc., Oliver Bldg., Pittsburgh 22, has issued a new catalog, containing design and operating features of precision engineered high speed swing frame grinders, and a detailed description of a complete line of grinding equipment. Grinders for heavy duty grinding of large slabs, heavy gates and risers, general purpose grinders for foundries or steel mills, and for use in light and maneuverable iron foundry operations, are described.

INDUSTRIAL EQUIPMENT — The Allis-Chalmers Mfg. Co., 565, Milwaukee 1, has announced a comprehensive directory of products and engineering literature which is available upon request for B6057. New products added since the previous directory, including induction and dielectric heating equipment, are described. Engineering literature, arranged according to product, with new bulletins starred for ready reference. The literature contains operating data, charts, formulas, and technical information of value to men who specify and buy equipment.

GAS ANALYSIS—Burrell Technical Supply Co., 1936 Fifth avenue, Pittsburgh 19, recently has published a 96-page catalog describing its gas analysis apparatus and procedures of conducting analyses with the equipment. Data are given on characteristics of some gases, principles of analysis, collection of gases, procedure of analysis, calculations, and specialized methods.

MAGNETIC PULLEYS—Dings Magnetic Separator Co., 509 East Smith St., Milwaukee, Wis., has issued a well-illustrated catalog, 260, which describes in detail pulleys, pulley type separators and other magnetic equipment. Use of the equipment in paper mills, grain elevators, textile mills, foundries, etc., is illustrated, as well as suggestions on selection of specific types, dimensions, specifications and capacities.

GLUE POTS — Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11, O., offers bulletin, B-4, 2-45-10M, outlining the outstanding characteristics of an automatic electric glue pot which maintains a uniformly low temperature at all times. Specifications, temperature graph and illustration of the 2-quart pot are given as well as a discussion of a master flake pattern glue also available from the company.

RUBBER GOODS—Manhattan Rubber Mfg. Division, Passaic, N. J., has completed printing of the fifth edition of a condensed catalog of mechanical rubber goods, available on request. Particular emphasis is given transmission and conveyor belting, V-belts, hose, packing, molded rubber products, rubber roll coverings, tank linings, and abrasive wheels.

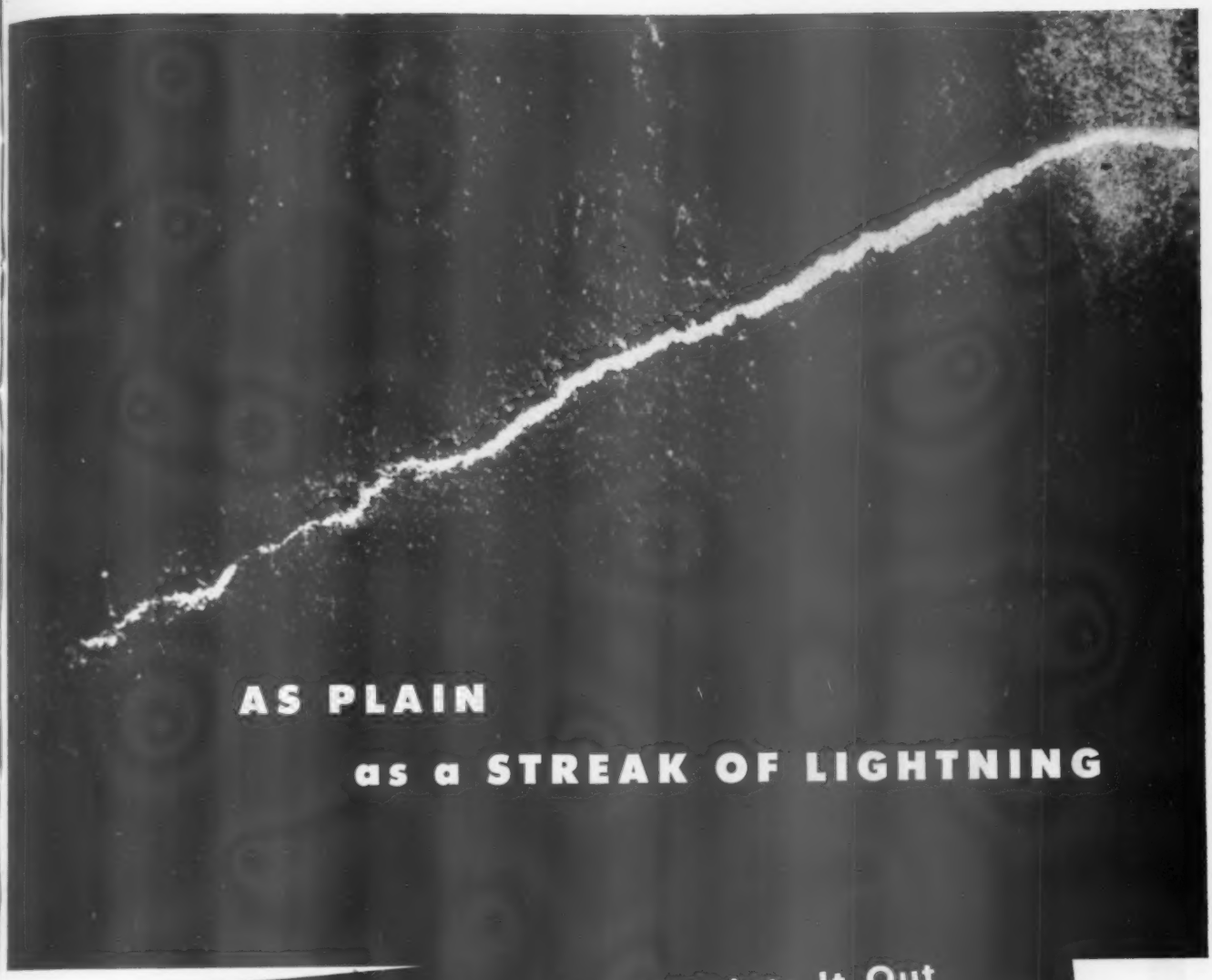
DUST COLLECTORS: Claude B. Schneible Co., 2827 25th St., Detroit, Mich., has issued a bound folder containing bulletins describing the application and operation of its various types of equipment for dust control. These include a general bulletin covering collectors, dewatering tanks and pumps, and separate bulletins describing the senior type collector, junior type collector, portable collector, entrainment separator, sludge pumps, settling and dewatering equipment, and collectors for aluminum-magnesium metalworking plants.

DIE CASTING—Lester-Phoenix Inc., 2711 Church Ave., Cleveland, offers a 4-page color folder describing two new high-speed, high-pressure die casting machines for production of smaller castings. One unit, for zinc, tin and lead alloys, capable of making 400 to 500 shots per hour, employs a submerged plunger and gooseneck injection system. The other unit, for aluminum, brass and magnesium alloys has a cold chamber injection system. Each of the models is convertible to operation with the other types of metals.

CHAIN BELTS—Bulletin No. 460, published by Chain Belt Co., Milwaukee 4, gives practical information regarding Z-metal chain belts, their applications, and illustrations of popular types. Another bulletin, No. 461, describes a new table top conveyor chain belt which has wide application in food handling and bottling processes.

LIFT TRUCK—Automatic Transportation Co., 101 West 87th St., Chicago 20, has available a six-page folder describing a battery-powered hand lift truck, equipped with front wheel drive,

(*Concluded on page 272*)



AS PLAIN as a STREAK OF LIGHTNING

...When Magnaflux* Points It Out

Actually, this is the picture of an *invisible* shrinkage crack in a gray cast iron generator housing—*as revealed by Magnaflux.* Beyond question, the part is defective. If assembled, trouble is sure to develop—later—when the whole generator would have to be torn down. Yet, in the old days, any inspector or foreman could have been forgiven for allowing this casting to leave the foundry.

With Magnaflux—it's easy to cull out such sub-standard parts and to analyze and correct the causes of defects. Every piece, or part, can be examined in the foundry for scabs, blow holes, porosity and shrinkage or surface cracks. All surface, and many sub-surface flaws, are pointed out by surface indications.

Why not look into the possibilities of Magnaflux, as applied to your business? It offers practical advantages in meeting more competitive business conditions. Thorough inspection pays out in protecting customer good-will. Just write us that we may send an explanatory bulletin.

**Magnaflux, Registered U. S. Patent Office, a trade mark of Magnaflux Corporation applied to its equipment and materials for magnetic particle inspection.*

MAGNAFLUX CORPORATION

M A G N A F L U X C O R P O R A T I O N

5918 Northwest Highway, Chicago 31, Illinois

NEW YORK • DETROIT • DALLAS • LOS ANGELES • CLEVELAND • BIRMINGHAM

RADIANT FACINGS
Since 1878
MANUFACTURED IN OUR OWN PLANT...
DISTRIBUTED FROM OUR WAREHOUSE

BILL GAGGER SAYS:
ON THE JOB
After the Civil War and Every War Since—
RADIANT FACINGS

MAKING
BETTER
CASTINGS FOR
64 YEARS

WE MANUFACTURE
Core Compounds
Core Washes • Blackings
Plumbago • Seacoals
Parting Compounds
Tripoli—Low Silica—Liquid
Core Pastes and Binders
Shake Bag Facings
Anti-piping Compounds
"Ferrograph" Graphitizer
Special Facings & Compounds

WE WAREHOUSE
Purite • Goulac • Glutrin
Bentonite • Silica Flour
Soapstones and Talcs
Truline Binder

The Smith Facing & Supply Co.
1857 Carter Rd., Cleveland, Ohio

(*Concluded from page 270*)

designed for lifting on skid platforms up to 6000 pounds or pallet loads up to 4000 pounds. Standard platform lengths are 36 to 72 inches; widths 20 and 26½ inches with heights 6, 7, 9 and 11 inches; lift from low to high position is 3½ inches. Standard pallet fork lengths are 30 to 60 inches in 2-inch steps; width 27 inches; height in low position 3⅜ inches with 3¾-inch lift; elevated height is 7⅛ inches.

THERMIT WELDING—An attractive 32-page illustrated booklet describing fabrication and repair by thermit welding, is offered by Metal & Thermit Corp., 120 Broadway, New York 5. The process is explained in detail, including a series of four-color charts illustrating in cross section the forming of a thermit weld. Information relating to general fabrication, repairs to heavy equipment, rail welding for steam and street railways, crane railways, etc., is included.

SANITARY CHEMICALS—Rochester Germicide Co., Rochester 5, N. Y., is offering an 8-page folder, entitled "The Prevention of Occupational Dermatitis," by Dr. Louis Schwartz of U. S. Public Health Service, reprinted with permission, as a public service to industry. An industrial hand powder and lotion are described.

OXYGEN: A new 24-page, two-color booklet entitled, "Oxygen—Indispensable Servant of Industry," has been published by Air Reduction Sales Co., 60 East 42nd St., New York 17, profusely illustrated and descriptive of its manufacture and uses in industry. Copies of the booklet, No. ADG-2014, are available on request.

PRECISION GRINDING: Minnesota Mining & Mfg. Co., St. Paul 6, Minn., has issued a 12-page booklet entitled "Faster, Better Finishing of Metal, Plastic and Glass," which describes the 3-M Wetordry method of precision grinding and finishing at high speeds. In nontechnical language an explanation is given of advantage of this grinding and finishing operation.

AMPCO METAL: Bulletin 71, a 26-page booklet published recently by Ampco Metal Inc., 1745 South 38th St., Milwaukee 4, Wis., gives a comprehensive picture of the plant, its products, facilities, and uses to which aluminum bronze and related copper-base alloys are being put. A discussion of sand and centrifugal casting is included, as well as forging, swaging, rolling, fabrication, anncaling, precision machining, and description of engineering service available.

ELECTRONIC AIR FILTRATION: American Air Filter Co. Inc., Louisville 8, has for distribution a booklet, "The Magic of Electronics in Air Filtration," graphically describing theory and practice of dust control with electronic equipment. Research and development in air conditioning systems is discussed.

DUPLEX MALLEABLE: Jackson Iron and Steel Co., Jackson, O., has a bulletin, "Essentials for the Production of Duplex Malleable Iron," available for free distribution. The material has been written from the standpoint of duplexing with the air furnace, but the main part of the description applies whether the secondary furnace is an air furnace, an electric furnace or an open hearth furnace. The description includes reference to the melting and annealing practice, and a condensed coverage of the metallurgical features involved in the process.

METAL SAWING: W. O. Barnes Co. Inc., 1297 Terminal Ave., Detroit 14, Mich., has published a new 48-page book, "Handbook of Metal Sawing," containing general recommendations on the use of hand and power hack saws, together with instructions on the operation and adjustment of metal cutting band saws. Sizes, specifications and prices are given, as well as tables of recommended teeth speeds relating to hand and power hack saws and conventional and skip tooth band saws.

CENTRIFUGAL CASTING: Bulletin No. 545, released by the Centrifugal Casting Machine Co., P. O. Box 947, Tulsa 1, Okla., describes a new model vertical machine, designed for the production of precision centrifugal castings. The machine is supplied with a 2-hp motor and starting switch. A model providing continuously variable speed can be supplied if desired. Fixture is designed to accommodate flasks 3 to 6 in. in diameter and 4 to 7 in. in length. Pouring block is located in pouring box. Flasks are placed in position in backing block and are secured in place by turning each cam lever to the right.

SPECTROGRAPH: Applied Research Laboratories, 4336 San Fernando Rd., Glendale 4, Calif., and the Harry W. Dietert Co., 9330 Roselawn, Detroit 4, have ready for mailing a 4-page folder describing a new two-meter grating spectrograph. Recently announced, the new instrument can be supplied with 36,600 lines per in. or 91,500 total grating lines, representing an unusually fine ruling. A 24 in. camera provides a 20 in. spectrogram on 35 mm spectrum film.

CASTING SEALER: Bulletin No. C-1A, published by the Metallizing Co. of America, Industrial Division, 1330 West Congress St., Chicago 7, is offered as a means of information as to use, specifications and price of a circulator as well as information and prices on a new casting sealer. The circulator makes possible the low cost salvage of castings which must withstand operating pressures and have been rejected because of porosity or pinhole cracks.

INDUCTION MELTING: Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J., have prepared an illuminative 14-page catalog which emphasizes big-job heating or melting of tons of metal as well as smaller jobs such as brazing, hardening, or precision melting. The circular, available upon request, provides helpful information on induction heating and melting.